THE ROLE OF ESTABLISHED VOLUNTARY NEIGHBOURHOOD GROUPS IN DISSEMINATING ENVIRONMENTAL INFORMATION

by

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I, the undersigned, hereby declare that this thesis contains no material which has been accepted for the award of any other higher degree or graduate diploma in any tertiary institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except when due reference is made in the text of the thesis.

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6 March 1998

ABSTRACT

This thesis examines the role of voluntary established neighbourhood groups in the dissemination of environmental educational material. It used a participatory case study approach to involve eight neighbourhood groups in an education program disseminating information about wood-smoke pollution and how smoke could be minimised through correct woodheater operation. A primary goal of the program was to determine whether or not an environmental issue such as wood-smoke pollution could be linked in and 'piggybacked' on established groups which have other principal interests. An information kit about the problems associated with wood-smoke and clear steps that can be taken to reduce wood-smoke was prepared and given to eight neighbourhood groups in Hobart and Launceston, Tasmania. The information kit comprised of overheads for a seminar, an information booklet, and a pamphlet. The groups were asked to disseminate the information in any way they thought fit. The researcher acted as a facilitator and was available to participate in education efforts and provided support to the groups.

The neighbourhood groups were surveyed to see what initiatives they took to distribute and promote the wood-smoke educational material. Observations were also made about the group processes within neighbourhood groups involved in the case study. The outcomes of the case study indicated that a considerable multiplier effect can occur by using established neighbourhood groups and their existing communication networks and interpersonal channels. The education activities carried out by the neighbourhood groups included public seminars on the topic of wood-smoke pollution, a door knocking campaign with wood-smoke pamphlets from the information kit, and education information was published in numerous newsletters. Overall the findings from the thesis indicate that established neighbourhood groups are willing to take environmental issues 'on-board' that are outside their principal interest.

Observations of the groups that became more fully involved in the education program were encouraging, and a range of group characteristics were identified which would be useful to target suitable neighbourhood groups for future studies. Assessment of the information kit showed that the pamphlet and seminar materials were of high quality. A telephone survey conducted as part of the assessment of the case study activities revealed that council newsletters may have limited success as a means of disseminating information.

This thesis has revealed that there are neighbourhood groups in the wider community that have established infrastructure, communication networks and channels that can benefit the distribution of environmental information. Supplying information to these groups on urban environmental issues such as the wood-smoke issue may provide a double benefit. Environmental education could be spread in an interpersonal manner and public interest and support for neighbourhood groups may increase.

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1 INTRODUCTION

This thesis sought to determine whether or not existing neighbourhood community groups would adopt an environmental problem, such as urban wood-smoke pollution, and become involved in the dissemination of environmental educational material. To test this, a case study was conducted using eight voluntary neighbourhood groups in Hobart and Launceston, Tasmania. These groups were asked to participate in a community education program disseminating information about the environmental and health impacts of wood-smoke and how smoke could be minimised through correct woodheater operation. A wood-smoke information kit was prepared for the groups consisting of a pamphlet and booklet with accompanying overheads for a seminar. The researcher acted as a facilitator, offering guidance and support for the groups in their educational endeavours. These included introducing the topic and the educational materials to the group members, and being involved in educational efforts initiated by the groups, such as conducting public seminars at public meetings organised by the groups.

1.1 BACKGROUND

Wood-smoke from domestic heating is a significant component of winter particulate matter (PM10) in all larger towns and cities in southern Australia. An estimated

50 000 tonnes of fine particles are emitted from woodheaters annually in Australia, mostly in urban areas (Todd 1994:437). Wood-smoke is a major contributor to air pollution in the Tasmanian capital city of Hobart and in the regional centre of Launceston (Lyons *et al.* 1996:1). The valley town of Launceston, in particular, has a reputation for being very smoky in winter as some quotes from the Launceston newspaper, *'The Examiner'* suggest:

> ***"Cosy fires of winter choking the city" 2nd July 1992***
>
> "With 20 000 chimneys pouring out wood-smoke every night, the result is throat and nose irritation, sinusitis, coughs, headaches, and more serious complaints, such as bronchitis, pneumonia and asthma, according to Dr Lloyd Lyons. In winter, he says, 'Most people would find some degree of discomfort' "(Launceston Examiner, 2/7/92, p.6).

"Fog Hollow" 28th April 1996

> "...while some may delight in the accompanying log fires, warm soups and mist-shrouded parks, others with asthma and other respiratory illness are filled with dread. Launceston's dubious honour as the most heavily smogged of four Australian cities surveyed in the recent Victorian Environmental Protection survey, continues to bedevil health and civil authorities awaiting the report of the Working Party on Air Pollution, Environment, and Health and Respiratory Illness. The three year pioneering study into Launceston's smog and its relationship to respiratory illness, is due to be released within a month" (Launceston Examiner, 28/4/96, p.2).

The aforementioned investigation by the Working Party established that, in 1995, around 70 percent of homes were using woodheaters as their primary heating source, and they were contributing in excess of 600 tonnes of wood-smoke particulates during a winter season (Lyons *et al.* 1996:1). The main conclusion of the study was that emissions from woodheaters were the most significant contributor to the particulate pollution in Launceston (Lyons *et al.* 1996:6). Hobart and Launceston continue to experience problems with wood-smoke during winter and were, therefore, deemed ideal sites for this current study. These issues are discussed in more detail in Chapter 2.

Over the last decade, epidemiological research in the field of environmental health has been gradually building a case for the potential adverse health impacts of wood-smoke and suspended fine particles on humans. Research specifically into the impacts of domestic wood-smoke on children has resulted in researchers suggesting that exposure to this source of air pollution be kept to a minimum (Pierson *et al.* 1989:339; Larson and Koenig 1993:19). Research on the health impacts of ambient fine particulates has found that exposure can lead to significant increases in morbidity and mortality (Vedal 1997:558). Overseas studies have found between 0.5-1.0 percent increases in mortality for every 10 $\mu g/m^3$ increment in PM10 (suspended particles with diameter less than 10 microns) (Vedal 1997:558). Therefore, wood-smoke may be presenting a public health risk which may concern

neighbourhood groups. Details of the health effects associated with wood-smoke are presented in Chapter 2.

These findings have greatly increased concerns amongst pollution control authorities about wood-smoke pollution. Recent national reports by the National Environment Protection Council (NEPC 1997) and the commissioning of the Australian Academy of Technological Sciences and Engineering (AATSE) Inquiry into Urban Air Pollution by the Federal Government highlight the recent concern with air pollution. The AATSE report of Task Group 3, investigating residential and local sources, reported that woodheaters and open fireplaces are major sources of suburban air pollution in Australia (Todd *et al.* 1997:59). This evidence, together with recent conclusions reached about potential health impacts of wood-smoke, means that there is a good case for aiming to reduce wood-smoke pollution.

It has been argued in recent years that the problem can be effectively managed through a combination of technology (better designed appliances), education (correct use of appliances), and regulation (heater certification, wood moisture limits, and policing at local government level). The importance of correct operation of heaters in reducing emissions is well recognised. Work at test laboratories has shown a halving of smoke emissions through correct woodheater operation (Todd 1994:439). Therefore, correct operation is critical in reducing the quantity of wood-smoke produced. Factors involved in correct operation of woodheaters are discussed further in Chapter 2.

Educating woodheater owners about techniques for improved heater operation is necessary if it is to be effective as a control option. Nationally, there have been mass media education efforts to better inform the community on correct woodheater use. These efforts are also described in detail in Chapter 2. It has been argued by researchers in communications and social psychology that mass media education campaigns are effective in increasing awareness-knowledge of individuals on a topic but they can lack the power of persuasion achieved through interpersonal communication channels (Syme *et al.* 1987: 445; Weenig *et al.* 1990:28; Rogers 1995:195).

To enhance the effectiveness of community education campaigns it has been argued that attempts be made to approach groups on a small-scale basis in a natural social

setting, such as established neighbourhood organisations (Weenig *et al.* 1990:28; Zimbardo and Leippe 1991:140; Rogers 1995:169). In recent years, community-based environmental management has been flourishing and Commonwealth and State governments have been recognising the value of supporting and funding these initiatives. Voluntary community group participation in environmental management such as Landcare, Coastcare and the general public's involvement in recycling, where 60 percent or more Australians are participating in kerbside recycling, suggest that people will 'do the right thing' if they are properly informed, supported, and encouraged. Although wood-smoke problems in some areas can be quite severe, it is seasonal and generally not of a significant magnitude to warrant setting up a community group specifically to deal with the problem.

Therefore this thesis asked the question, can an environmental issue such as the wood-smoke problem, be linked into, and 'piggyback' on, established groups which have other principal interests?

1.2 RESEARCH GOALS

This study specifically used established neighbourhood groups, for example Neighbourhood Watch, Progress Association groups, and Child Health Association groups, because they have existing social networks and communication channels between their members and the wider community that may assist in the dissemination of educational information. It was hoped that the groups, despite having other primary interests, would take the issue 'on board' and develop the role of educators themselves. It was also thought that by using these established groups it would be possible to target groups that were successful and working well and thereby increase the likely success of them exchanging and transferring information to the wider community.

Therefore, the hypothesis underlying this research is that established voluntary neighbourhood groups can provide interpersonal channels and a range of other communication benefits that will enhance the persuasive power of the correct heater use message.

The aim of this study was:

> to address whether established voluntary neighbourhood groups are an effective means of disseminating environmental information.

In order to achieve this aim, a case study was conducted where selected neighbourhood groups were asked to participate in the dissemination of information about the problems of wood-smoke and the correct operation of woodheaters.

A broad approach was adopted to review relevant literature, prepare a suitable information package and trial it with neighbourhood groups in the case study. The researcher identified three critical issues which were necessary to review in detail in order to develop and conduct the education program and case study:

1. it was necessary to gain a sound understanding of the technical aspects of wood-smoke generation in woodheaters and the way in which correct operation reduces smoke so that an information kit could be prepared by the researcher for presentation to the neighbourhood groups;
2. it was also important to gain an understanding of the health impacts of wood-smoke on humans because the perceived health risks were seen as important for motivating the groups; and
3. it was of fundamental importance to develop an understanding of community groups acting as agents for exchange and transfer of information, both in theory and in practice.

These three issues are dealt with by way of a literature review presented in Chapter 2. On the basis of information collected, it was then possible to design the wood-smoke education case study and prepare the educational materials for community group use.

The specific objectives of the thesis were to:

- review the three key literature areas discussed above;
- prepare education materials about the correct use of woodheaters and the environmental and health impacts of domestic wood-smoke on humans as an issue of community concern which would assist in the effective dissemination of the information;

- for the researcher to act as a link and support to the selected neighbourhood groups to encourage them to participate in this program whilst recording and monitoring their actions and responses; and
- to review the short-term effectiveness of the education program.

In addition to the literature review, the strategies used to realise the aim and objectives of the study were to:

- assemble a network of eight established voluntary neighbourhood groups in Hobart and Launceston to participate in the case study;
- create a wood-smoke information kit, comprising a pamphlet, a seminar booklet, and overheads suitable for continued use by the groups. The information would be packaged in such a way as to make it useful for neighbourhood groups which might not have prior technical knowledge of the issues being addressed;
- conduct introductory sessions with all the groups to introduce them to the wood-smoke problem and the information kit; and
- provide ongoing support and communication with the groups in their educational pursuits.

1.3 RESEARCH APPROACH

In order to conduct this study it was necessary to take an inter-disciplinary approach. This method forms the basis for much of the research conducted in environmental studies. A wide range of ideas and theories were drawn from the fields of environmental psychology, community sociology, public health and other disciplines. The study was highly interactive and did not conform to a traditional-empirical format.

It has been argued that there needs to be a move away from the top-down traditional institution-based approach for dealing with local environmental problems where specialist researchers linked to government agencies and bureaucracies deal with problems (Carr 1994:333; Harris and Robottom 1997:2). There is a need for studies

in environmental education to be participatory, thereby involving members of community groups in the processes of research itself. It is proposed that, rather than limiting the format of education to the transfer of research findings about environmental issues to specialists and the wider public, community-based education can provide local people with information and stimulate critical debate on environmental issues that have direct meaning within those local communities. Harris and Robottom (1997:4) comment that:

> "community-based environmental education is a participatory research activity which meets the expressed needs of the community as well as having an academic purpose."

This study has essentially been an example of action, or participatory, research where there is:

> "action to bring about change in some community or organisation or program, research to increase understanding on the part of the researcher, or the client, or both and often some wider community" (Dick 1992:2, as cited in Crennan 1995:5).

In this type of study, the role of the researcher is often as a facilitator, or co-learner, actively participating in the learning and educating process. In this study, the researcher adopted a "participant-as-observer" role, making it possible to be involved in formal meetings and in the education processes whilst still being regarded as an academic researcher (Carr 1994:81; Babbie 1992:289). Taking this role allowed for the studying of processes, relationships amongst group members, patterns and processes over time and is, therefore, suitable for this type of research (Jorgensen 1989, as cited in Carr 1994:81). Community studies such as this aim to understand voluntary community groups, their processes and their possible future involvement in environmental management.

Harris and Robottom (1997:2) write:

> "with each passing decade, it becomes more evident that lasting, long-term solutions to environmental issues can only come from

the commitment of individuals, communities, and society as a whole, to pursue environmental lifestyles and policies."

Encouraging community involvement in managing environmental problems will be necessary and important if we are to gain behavioural changes and commitments from Australian society.

It needs to be stated that it was not possible in this thesis to develop every aspect and field that the broad research topic has touched upon. For example, although reading in the field of environmental education was conducted it was not possible to prepare detailed analysis of this previous literature and it was assumed the reader could place the importance of this study within this context without elaboration by the researcher. Similarly, a general discussion on air pollution was not developed and the reader is again assumed to have a basic understanding of the complexity of the air pollution problems faced throughout the world.

1.4 CHAPTERS IN REVIEW

The literature review presented in Chapter 2 sets the context of the case study by combining the three key literature areas (see Section 1.2) relevant to this thesis. The chapter draws together: technical information on the wood-smoke problem; the current concern about the health effects of wood-smoke; and the recent acceptance of community group involvement in environmental management. This facilitated the development of a case study designed to determine the viability of established neighbourhood group involvement in environmental education.

Chapters 3 to 6 outline, discuss and evaluate the case study. Chapter 3 provides detail about the research methods used and can be divided into three sections. Firstly, it describes the methodology used to design, execute and evaluate the neighbourhood group involvement in the case study. Secondly, it describes the development of an educational package (a pamphlet, booklet and accompanying overheads for a seminar) for the neighbourhood groups, and the processes used to evaluate these materials. Finally, the chapter describes the procedures used to design, conduct and evaluate a telephone survey that had a number of aims,

including determining the effectiveness of newsletters as a medium of information exchange.

Chapters 4, 5 and 6 contain the research results of the case study. Chapter 4 presents the qualitative and subjective results prepared by the researcher of the neighbourhood groups involvement in the case study. It also documents feedback from the group leaders about the education program and their opinions regarding the participation of their group in the program. Chapter 5 presents the results of an assessment of the information kit distributed to the participating groups. These include comments on the pamphlet made by a panel of experts in producing educational material and the results of a survey conducted at public meetings to determine the quality and educational value of the seminar materials. Chapter 6 reviews the results of a telephone survey conducted in an inner Hobart area to gain an understanding of the current attitudes towards the issues of wood-smoke and education, and to determine the effectiveness of newsletters in disseminating educational information.

Chapter 7 summarises the main findings of the thesis and discusses the implications of the results. The literature review and the case study results, generally support the hypothesis that established neighbourhood groups will 'piggyback' environmental issues, such as the wood-smoke problem. However, the case study only had moderate success, with three out of eight groups 'taking-on' the wood-smoke problem and becoming more fully involved in the education program. Observations of these three groups were encouraging and a range of characteristics were identified that could be used in future studies to target suitable neighbourhood groups for education programs. The results of the telephone survey revealed council newsletters may have limited success as a means of dissemination of wood-smoke information. A segment on a lifestyle television program about wood-smoke pollution, and, modelling correct woodheater use, was recommended by respondents in the telephone survey as a useful means to transfer wood-smoke information. Assessment of the information kit showed that both the pamphlet and seminar materials were of high quality. The majority of neighbourhood group representatives that provided feedback reported they found the project very worthwhile, interesting, and relevant to their group's charter. Several wish to be involved in similar

environmental projects in the future and four of the groups have some plans to distribute the wood-smoke information in the winter of 1998.

2 LITERATURE REVIEW

This chapter reviews information relevant to the preparation of material for the case study. In order to exchange information with the neighbourhood groups and prepare materials for them, it was necessary to become informed and familiar with the complexity of the wood-smoke problem. Therefore, it was of prime relevance to review literature exploring the nature of the domestic wood-smoke pollution in Australia, and its impact on public health and the environment. It was also critical to investigate theories and practices of persuasive communication, the influencing components of messages and information-processing and the benefits of using community groups in information dissemination.

2.1 ESTABLISHING THE NATURE OF THE WOOD-SMOKE PROBLEM

2.1.1 The use of wood for domestic heating in Australia

Smoke from domestic woodheaters has been a pollution problem in Australia for the past two decades (Todd and Singline 1989:13). In Tasmania, and elsewhere, over the past three to five years, there has been a groundswell of concern about wood-smoke's environmental and health impacts. Wood-smoke is a significant contributor to air pollution in the capital city, Hobart, and the major regional centre of Launceston.

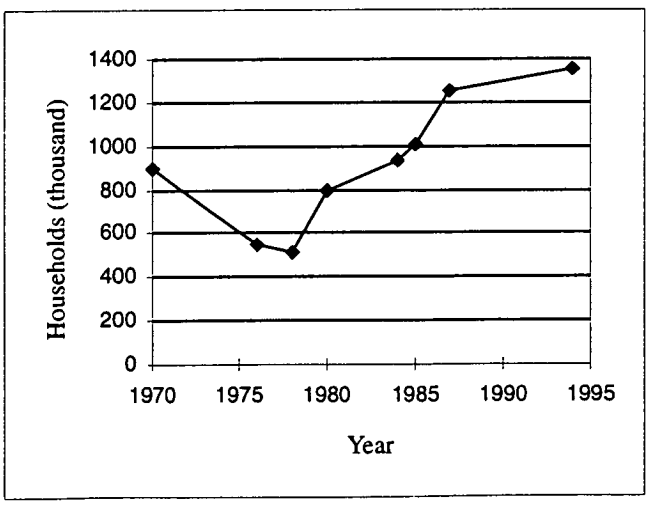
It is estimated that 1 200 000 households in Australia use firewood as their primary heating source, whilst a further 300 000 use wood as a secondary heating fuel. This means about 20 percent of Australians use wood for heating (ABS 1994:38; Wood Heating Association 1997:2). The relative mix of controlled combustion woodheaters and open fires is not well known as no recent studies have addressed this issue. However, the Wood Heating Association estimates that about 700 000 are open fireplaces and 800 000 are combustion woodheaters (Wood Heating Association 1997:2). In Tasmania, in 1997, an estimated 500 000 tonnes of wood were burnt for fuel (LGA TAS 1997:5). It is the main heating source for 108 000 households (61% of the population), nearly twice the rate of the next highest ranking state, Western Australia (32%). Additionally, in Tasmania, another 11 000

households use it as an occasional or secondary heating source (ABS 1994:38; Wood Heating Association 1997:16).

Tasmania has always had the highest proportion of wood heated homes in Australia. Estimates of the proportion of households using firewood as a principal form of heating were recorded in the National Fuelwood Study (Todd *et al.* 1989:46). In 1988, 66.2 percent of households in Tasmania used wood as a main heating source. Wood heating is not as popular in the other states and percentage of use ranges from 32 percent to about 2 percent (ABS 1994:38). There are some important factors contributing to the popularity of heating with wood in Tasmania such as: the relatively low cost of fuelwood; the efficiency of woodheaters and their capacity to overnight burn; a general societal trend (that is, families in Tasmania have long been using woodheaters and it is almost traditional); and the lack of availability of other cheap fuel options such as reticulated natural gas (Todd and Singline 1989:13). These factors mean that firewood continues to play an important role as a domestic heating source in Tasmania.

2.1.2 Historical trends of woodheater use

During the period of 1978 to 1987, woodheaters experienced a rapid increase in popularity followed by a more gradual increase to 1995. This increase, in 1978, was in response to rapid price increases in domestic heating oil resulting from the world parity oil pricing policy.



Source: Todd 1994

Figure 2-1 The number of households using firewood for heating in Australia from 1970 to 1995. (Points are estimates)

This event coincided with an increase in electricity costs and the development of attractive and more efficient combustion controlled woodheaters (Todd and Singline 1989:13). Figure 2.1 illustrates the trends in the number of households using wood for heating since 1970. Since 1995, it is likely there has been a slight decline. As a consequence of these combined events, woodheater sales increased and peaked in the late 1980s and early 1990s. Since then, there has been a substantial drop in sales. This is thought to be due to changing preferences and appliance saturation in the market (Wood Heating Association 1997:3).

2.1.2.1 History of compliance with the Standard

The wood heating industry, unlike the Australian Gas appliance manufacturing industry, chose not to be self-regulating over the years leading up to 1992. In 1992, the Australian Standards (AS4013) of 5.5 grams of particulate material per kilogram of burnt fuel and (AS4012) for testing performance were published after four years of development. In 1993, Tasmania was the first state to call up the Standards in the State pollution control legislation. The Australian Capital Territory (ACT) followed in 1994 and New South Wales (NSW) in 1996. This testing and certification has meant that heaters sold in Tasmania since 1992/1993 are producing roughly half the wood-smoke of older heaters (Todd *et al.* 1997:14).

However, the legislation enacted in the states and territories that have called up the Standard is not thorough. For example, in Tasmania, it is not illegal to alter your woodheater once you have purchased it. Thus, there is no mechanism to restrict a common practice undertaken by home owners and some heater retailers whereby the minimum burn rate stop (which ensures there is sufficient air to maintain a clean burn) is removed to allow the heater to burn longer unattended. Another flaw is that there is no policing of the legislation. This means less conscientious heater retailers could, potentially, without the consumer's knowledge, sell a model claiming to release a certain amount of emissions but which differs from the one tested. Finally, there are still states, such as Victoria and Western Australia, that have not called up the Standards in their pollution legislation. The history of regulation in the woodheating industry in Australia is short and further developments will need to occur.

2.1.3 Wood-smoke pollution

Wood-smoke is known to contribute to urban air pollution in a number of Australian cities and regional areas. For example, it is well-established that woodheaters arecontributing significant amounts of particulate pollution to the city of Launceston in Tasmania (Lyons *et al.* 1996:3). Other areas with problems include Armidale, Perth, Canberra, Hobart and many regional towns where woodheater use is high and topography and climate limit air movement. However, even cities such as Melbourne and Sydney can experience wood-smoke problems during the winter months (Todd *et al.* 1997:12). For example, on two occasions in Sydney in 1997, the NSW Environment Protection Authority (EPA) trialed a voluntary wood-smoke curtailment program as days of poor ventilation and high pollution were predicted (Todd *et al.* 1997:20). Actual measurements of air quality in urban areas affected by wood-smoke are rare. However, over the years, levels in both Launceston and Hobart have been recorded. The recommended maximum level of suspended particulate matter in Australia is currently 120 $\mu g/m^3$ (24 hour average). Although the wood-smoke levels have probably improved somewhat since the late 1980s and early 1990s, Launceston recorded TSP concentrations up to 250 $\mu g/m^3$ (24 hour average) in July 1991 (Todd 1992:80) (see Plate 2.1 and 2.2). In Hobart, levels up to 150 $\mu g/m^3$ were recorded in 1989 (Usman 1989, as cited in Todd 1994:439). Therefore, in some regions, wood-smoke is a significant air pollution problem.

2.1.3.1 Environmental factors influencing wood-smoke pollution

The impact of wood-smoke on communities tends to be influenced and aggravated by three factors: meteorology; topography; and emission levels. Areas that experience wood-smoke problems commonly undergo temperature inversions during the winter months. They are often (but not always) in valleys or canyons surrounded by hills, ridges or mountains and have a high percentage of households using woodheaters. In winter, the combination of these factors make an area prone to air pollution. Studies in the United States have found up to a four-fold difference between various parts of towns. In the valley town of Klamath Falls in Oregon, for example, the Oregon Department of Environmental Quality (DEQ) found that wood-smoke concentrated in the valley floors, while smoke levels on the ridgeline and in the valley differed consistently by a factor of between two and three.

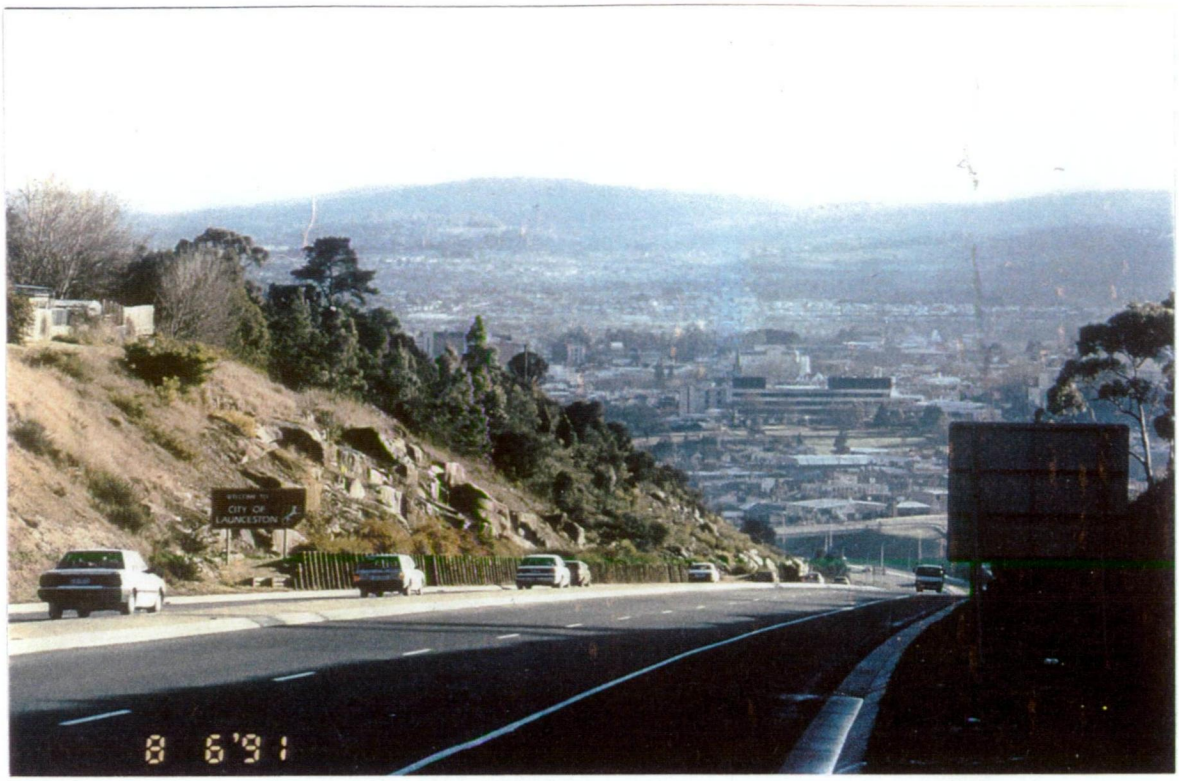


Plate 2.1 The city of Launceston on a day unaffected by wood-smoke.

Plate 2.2 The city of Launceston on a day affected by wood-smoke.

Therefore, the fine particulate wood-smoke pollution can vary from location to location within an area (Larson and Koenig 1993:10)

Although, every area will be somewhat different, the example of Launceston in Tasmania will illustrate some common features. Launceston is located in the Tamar Valley. It is surrounded by ridges and hills on both sides that range from 100-1500 metres in height. This sheltered environment plays an important role in the winter air quality problem (Lyons *et al.* 1996:14). In Launceston, the local meteorological conditions - calm, cold weather conditions leading to cold air drainage and low level inversions - and the local topography, combine to produce high concentrations of smoke on many nights during winter.

Over time (days or hours) this can lead to degraded air quality. When the air begins to mix (e.g. from thermal turbulence caused by morning solar heating or from a wind developing) this temperature inversion is broken. The emissions can then be mixed through this previously stable lower layer of air to the ground level. This process is termed fumigation and can result in a short period of extremely high levels of pollutants concentrated at ground level. It is only when the regional air mass as a whole is changed that the built-up pollutants are removed. Such a condition might be a frontal system. In Hobart, smoke also moves down the hills and ridges to accumulate in the valley. However, unlike in Launceston, Hobart's harbour is open and a lot of the polluted air is carried out to sea. For this reason, the wood-smoke problem in Hobart is less severe.

2.1.3.2 What is it about woodheaters that make them pollute?

There are many factors that influence the total emissions released from residential woodheaters: the design of the appliance; the type of fuelwood (in particular its moisture content); how the appliance is operated; and the frequency of use (which will be influenced by the weather and user preferences) (Todd 1994:438). Woodheaters are batch-fed appliances. They are operated by filling them with a large load of fuel added all at once, with the heat output (and therefore the combustion rate) controlled by the supply of oxygen made available to the fuel. Unfortunately, this design lends itself to incomplete combustion because operators wanting to reduce the temperature of the fire will reduce the air supply (Todd 1994:441). The resulting lack of oxygen, and other appropriate combustion

conditions, restricts burning of the volatile oils, tars and gases released from the wood. Instead, they escape up the flue where they cool, condense, and become droplets of oils and tars that constitute wood-smoke.

2.1.3.3 Combustion processes of wood

Wood is mainly composed of cellulose and lignin. At high temperatures, the cellulose and lignin molecules begin to undergo chemical changes. They breakdown into small molecules which are released from the wood as gases, tars and oils. When these gases, oils and tars are not burnt they escape up the chimney as smoke. Therefore, smoke is, in fact, wasted fuel. When a heater is producing very little smoke it is burning efficiently and thereby reducing running costs.

Combustion of the released gases, tars and oils will only occur if certain conditions are maintained in the woodheater. There needs to be high temperature (around 600 C +), sufficient free oxygen, good mixing of air and combustible gases, and all these conditions must be maintained for a long enough time for the gases to burn. This will lead to maximal combustion of the wood and minimise the amount of smoke and creosote the fire produces. If the conditions for combustion are maintained, the gases, tars and oils will vaporise out of the wood and enter a zone where they burn vigorously, releasing heat. Almost 70 percent of the energy radiated from a fire results from the burning gases. The reality is that the combustion process is never totally complete, mostly because there is never perfect mixing of the air and gases. Thus, woodheater users should aim to maintain the conditions necessary to maximise combustion.

2.1.4 Controlling the problem of wood-smoke

Controlling the problem of wood-smoke pollution is of concern for the government and pollution control authorities in Australia. There are four broad approaches, which do not involve replacement of woodheaters by other forms of heating that could be taken:

1. improved appliances (this is the responsibility of the manufacturing industry but it must be driven by the pollution control authorities);

2. better use (the responsibility for community education is shared between the industry, state pollution control authorities and local government);
3. restricted use (this is the responsibility of pollution control authorities and local government); and
4. firewood quality (this is the responsibility of fuel merchants but it must be driven by state pollution control authorities).

Other examples of solutions to contolling the wood-smoke pollution problems include partial elimination through the use of alternative fuels such as electricity or through conservation strategies such as better insluation.

2.1.4.1 Improved use of woodheaters

This thesis focuses on the second of these approaches - better use. Testing has shown that correct operation techniques are critical in determining the amount of wood-smoke produced. In an extreme case, a very poorly run woodheater might produce as much as ten times the smoke produced by a well operated woodheater for a given amount of heat. However, a realistic estimate of relative smoke emissions from a well operated woodheater and one operated without any consideration of emissions would be around a factor of two. Thus, half as much smoke is emitted from the well operated woodheater (Todd 1994:441).

There are a number of operational techniques that need to be employed to reduce wood-smoke levels. Firstly, the preparation of the fuel is critical. It is well known that a high moisture content in wood will significantly affect the amount of smoke produced. It is recommended that moisture content be between 12-20 percent. Secondly, the way fuel is loaded into the appliance and the operation of the combustion air controls will influence emission levels. Correct operational techniques improve the efficiency of the woodheater and reduce creosote build-up in flues. Table 2.1 indicates the sort of initiatives that can be used to reduce emissions.

2.1.5 Community education campaigns

The idea of educating the general community of woodheater owners on correct operational techniques like those mentioned in Table 2.1 is not altogether new.

Governments overseas, in particular the United States, have been conducting education efforts for some time. The Australian Government has only recently become more active in its effort to educate the community about the importance of good heater operation. Unfortunately, community education on woodheater operation is not an easy undertaking because people are often unaware of the consequences of the techniques they use. Wood-smoke emissions, for example, are rarely noticed from the comfort of the lounge room.

Table 2-1 Hints for correct use of woodheaters.

1. Always run the heater on its maximum burn rate setting for 20 minutes after refuelling or lighting the heater.
2. Do not over-fill the heater. There must be space above the wood load to allow gases to burn.
3. When lighting a cold heater always use sufficient kindling to get a good hot fire established quickly.
4. If the fuel load has burnt down very low so that only a few red coals are present, do not add large logs. Instead, add some paper and small wood pieces to get the fire re-established.
5. Use smaller logs for high heat outputs and larger logs for slower burning.
6. Always use dry firewood. It should have less than 20 percent by weight of water. Store wood in a well ventilated, covered space.
7. Place logs in the firebox with about 2 cm between logs to allow combustion air to penetrate the stack of wood.
8. Check your flue for visible smoke from time to time. There should be only very faint smoke, or preferably no visible smoke, except for a 10 to 15 minute period after lighting or refuelling. Try adjusting the fuel load and air settings to minimise smoke.
9. Keep your heater and flue in good working order. Inspect annually.

Intervention programs to influence behaviour, and measuring their impact, are invariably difficult. However, if a method of getting people to operate their woodheaters correctly was in place, it could be a cost-effective means of controlling wood-smoke. Todd *et al.* (1997:21) speculated that, if we could reduce the number of households operating their heaters poorly from 60 percent to 20 percent, there would be a reduction in wood-smoke of around 25 percent and, therefore, about a 15 300 tonne per year reduction in wood-smoke particles nationally. Given that the recent "Breathe the Benefits" trial (see Section 2.1.5.1) cost around $75 000, a national campaign might cost $250 000, meaning that provided the education campaign prove successful in changing users behaviour the cost of reducing emissions from woodheaters through correct operation technique education would be around $16/tonne (Todd *et al.* 1997:21). Consequently, mass community education is an ongoing control option that governments in Australia and overseas continue to pursue.

2.1.5.1 Australian efforts to educate the community about correct woodheater use

Breathe the Benefits

In the winter of 1997, the Commonwealth Government conducted a trial community education campaign entitled "Breathe the Benefits" aimed at reducing domestic wood-smoke emissions. The campaign was coordinated by Environment Australia in conjunction with the Department of Environment and Land Management in Tasmania, and the Department of Environmental Protection in Western Australia. The key messages of the campaign to reduce wood-smoke from woodheaters were as follows: use dry, seasoned, untreated wood; stack wood under cover; use small logs; burn the fire brightly; and maintain a flame if burning overnight. The information was disseminated using; television advertisements, posters and a booklet composed of five info-postcards. The info-postcards included a competition quizzing readers on the woodheater operation tips. Distribution in Tasmania included a small run of advertisements and letterboxing of the info-postcards. Posters, info-postcards and an A4 wood-smoke information sheet were distributed in supermarkets on the day that the program was launched. Some of the posters and info-postcards were distributed in Tasmanian schools and Environment Tasmania officers organised a woodheater

display at the annual Agricultural Festival, AGFEST (John Durham pers. comm. and Jocelyn Phillips pers. comm. November 1997).

In parallel with the Breathe the Benefits campaign, the Bureau of Meteorology in Tasmania, with the cooperation of television stations, made a daily forecast of Launceston's air quality. There has also been a surge in community action groups concerned about the problem of wood-smoke. For example, in 1997, two groups of concerned citizens, the "Australian Lung Foundation", and "The Tasmanian Air Quality Study Group", organised public forums on the topic of air pollution with a focus on wood-smoke in Launceston.

In the past, in Tasmania, the main community education effort was associated with a working party examining the air pollution, environmental health and respiratory diseases in Launceston and the Upper Tamar Valley (Lyons *et al.* 1996:9). Between 1991-1995, the media in Launceston were very cooperative with the Working Party and produced a series of large journalistic articles on the subject. Television interviewers and radio presenters also participated in this public relations effort. Appropriate teaching materials were distributed through selected secondary schools and in relevant academic departments of the University of Tasmania.

Western Australia

In Western Australia, the Department of Environmental Protection were already running an education campaign for the winter of 1997. They designed a small "pop-up" house (12cm x 10cm x 20cm) colourfully decorated with cartoon style graphics. Inside, they placed educational materials about operating woodheaters correctly, about saving money on home heating, some advertising from competing heating industries, and a competition quizzing readers on the woodheater operation tips. Thirty thousand 'pop-up' kits were printed and distributed. Four suburbs with wood-smoke problems, and two suburbs with indications of becoming problem areas, were targeted for distribution. Twenty thousand kits were letterbox dropped in these regions. A further two thousand kits were given to a random selection of schools, four thousand were given to shopping centres to hand out, and the remainder were available at the Department to give away when appropriate. A trial is also about to begin targeting the wood suppliers to encourage them to sell dry and seasoned wood. Fifteen moisture meters are to be distributed to volunteering local

wood merchants to assist them in measuring moisture levels in their wood prior to sale. This trial is to commence in the near future. An information campaign to encourage woodheater operators to purchase wood in the summer is in preparation for the summer of 1998. The Commonwealth trial was a timely bonus for Western Australia, and like Tasmania, involved the distribution of posters, info-postcards and television advertisements (Jennie Anderton pers. comm. November 1997). The Commonwealth trial was evaluated through pre- and post-campaign telephone surveys. The results indicated that people mainly recalled the television advertisements associated with the programme (Attwater and Thorp 1997:4; Attwater and Thorp 1997a:1).

Queensland

In Queensland, wood-smoke is not a significant problem because of the low use of woodheaters. However, the Department of Environment QLD has produced two brochures in recent years on woodheater operation and there is currently an Air Quality Discussion paper calling for submissions in which woodheaters are included. Since August 1997, air quality forecasting has been included with television weather information in Brisbane (Peter Tarrent pers. comm. November 1997).

Victoria

In Victoria, little education on wood-smoke has been done in recent years, apart from some short brochures. In July 1997, the Victorian EPA produced an information newspaper lift-out on air quality. Woodheaters were mentioned in the lift-out but the primary focus was on motor vehicle emissions. This lift-out was accompanied by some television advertisements and a media release. The Victorian EPA is currently in the planning stage of a campaign for the winter of 1998 (Melinda Nutting pers. comm. November 1997).

ACT

Environment ACT currently has wood-smoke information pamphlets available for the public in their department and council offices. Inspectors who are called out to investigate wood-smoke complaints give the woodheater owner advice and educational material on how to operate their woodheaters correctly. Two years ago,

Environment ACT conducted a media-based woodheater education campaign involving television and radio (Peter Walsh pers. comm. November 1997).

NSW

In June 1997, the EPA in NSW launched a community participation program along with educational materials to reduce smoke from wood fires and heaters. The program was the first voluntary wood-smoke curtailment program to be trialed in Australia. This control option has been used in the United States since the late 1980s. The Australian program entitled, 'Don't Light Tonight', involved collating information from the Bureau of Meteorology, the University of New South Wales and the EPA's own air pollution data, to predict days of high air pollution and poor ventilation. On those days, a media release was prepared by the EPA requesting people with woodheaters (particularly older heaters that did not comply with the Australian Standards AS 4013) to refrain from using them and utilise an alternative heating source. Over the winter of 1997, there were two curtailment requests issued, one on June 11th and the other on August 29th. A telephone information line was made available to provide woodheater owners with information, while posters and brochures were distributed to local government and community groups. Information in suitable languages for inclusion in local papers was distributed to local government (Phil Smith pers. comm. November 1997).

The Armidale City Council has been active in trying to address the wood-smoke problem in their community. A council representative regularly visits schools, providing information to students and facilitating discussions. The Council has also presented posters at various conferences. In response to local complaints about wood-smoke, a council representative will visit the woodheater owner and discuss operation techniques and provide information brochures. Council updates its wood-smoke education brochures annually and, each year, radio announcements are conducted on the topic to increase awareness. The Council has also introduced a fridge magnet with instructions on how to operate woodheaters correctly (Peter Ainsworth pers. comm. November 1997).

SA

The South Australian EPA have an agreement with the Australian Wood Heating Association (WHA) that the WHA will attend complaints made to local councils,

and they will provide educational information and advice on correct operation and maintenance of woodheaters. The EPA produced a pamphlet entitled "Smoke is No Joke" in February 1992, and this has recently been updated. It is widely available from council offices and government departments (Margaret Doolan pers. comm. November 1997).

2.1.5.2 International efforts to improve poor air quality caused by woodheater emissions

USA

In 1987, five urban areas in Oregon: Klamath Falls; Medford-Ashland; Eugene-Springfield; La Grande; and Grant Pass were experiencing severe wood-smoke pollution that exceeded air quality standards in the United States. Since then, they have adopted a number of strategies to reduce wood-smoke and now meet the Federal Clean Air Act 1994 for the air quality standards for particulate matter (PM10) (DEQ 1997). Some of the strategies have included voluntary wood burning curtailment programs on "red" days (those with poor ventilation), banning the sale of uncertified woodheaters, home weatherisation and woodheater replacement programs, and maintenance of public education programs. To generate interest in air quality, public awareness and education programs conducted have included: public radio announcements; posters, brochures, bulk mailing, mail inserts; community meetings and individual contacts; a wood-smoke advisory telephone number; newspaper articles; advertising in newspapers and on radio; distribution of information on wood-smoke health effects; public speaking engagements and forums on PM10 and health effects, proper wood burning methods, and local ordinance requirements; and coordination with woodheater and home heating dealers, government agencies and public service organisations. The public education and voluntary curtailment programs have been very successful in reducing PM10 pollution, and in all areas, have generated a high level of awareness and participation (DEQ 1997).

In the Rocky Mountain valleys of Colorado, wood-smoke pollution is a recognised problem. In the City of Fort Collins, they have adopted a Four Point Program called the City Code to address the problem. The Fort Collins City Code prohibits the burning of treated wood and garbage and coal can only be burnt in a coal-burning

appliance that is the sole source of heat and when no other central heating system exists. It also stipulates that, after the first fifteen minutes or so of start up, the smoke from the chimney must be light, or have less than "40% opacity". Finally, the only acceptable fuel that can be burned in a woodheater or fireplace, or other home fuel-burning device is clean, dry, untreated wood or wood products, or other solid fuel products specifically made for the purpose of space heating.

The City has tried to help residents to resolve smoke problems in their neighbourhoods through a citizen complaint line. Callers are asked to identify the residence where the problem is occurring, or at least describe the approximate location. The City then sends a letter, along with a copy of the City Code and information about proper wood-burning practices, to all homes in the area, including the problem address. The City continues to work with the caller and the problem residence until the issue is resolved. Since 1990, the City has offered zero interest loans to woodheater and fireplace owners. The program places a high priority on woodheater dismantling or upgrading of woodheaters and stoves. Through the interest free loan system, applicants may borrow up to $1,500 toward the upgrade or dismantling of a wood-burning appliance. There is also emphasis placed on the importance of citizen participation in correct operation of woodheaters, and they continue to produce educational material and distribute it in a similar fashion to Oregon (USEPA 1997).

Another area in Colorado, called Telluride, is also battling the wood-smoke problem. Telluride officials are discussing whether or not to eliminate fuel burning devices in an effort to improve air quality. The Environment Commission continues to educate woodheater operators on efficient burning and they are looking into ways to enforce their current permit system which requires woodheater owners to have two permits and be registered with the Town Hall. Under consideration is the employment of a "smoke cowboy" who would act like a parking inspector but the "cowboy" would examine emissions. A building inspector was also recently employed to enforce woodheater permits as part of their normal inspector duties (USEPA 1997).

A search on the Internet illustrates a great deal of action has been undertaken in the United States and Canada in relation to the wood-smoke problem (http://www.epa.gov/; http://www.web.epa.ohio.gov/dapc/page.other.html). Some of

the areas with problems in the United States include; Oregon, Seattle, Colorado, Alaska, Montana, Idaho and the State of Washington (Rawlings 1997:6).

Canada

British Colombia's climate, geography, and settlement patterns make it particularly susceptible to pollution from woodheaters. Many of the interior communities live in the valley bottoms and wood-smoke can be trapped and accumulate to high concentrations during 'air stagnation' periods. The Ministry of Environment, Lands and Parks, along with government agencies, is developing a smoke management strategy which includes encouraging the use of efficient and certified woodheaters, prohibiting wood burning on days with poor atmospheric dispersion in communities where smoke is a problem, and providing information on correct operation (BCME 1997). Nova Scotia Natural Resources Minerals and Energy Branch provides information about wood-smoke, choosing a heater, and operating techniques. Other areas with wood-smoke problems include, Quebec, Ontario, and the Yukon Territory (Rawlings 1997:5)

New Zealand

The city of Christchurch in New Zealand experiences severe winter air pollution. A representative from the Canterbury Regional Council (CRC) provided the following information on woodsmoke education efforts in New Zealand (Emily Foster pers. comm. February 1998).

New Zealand has been quite progressive in its efforts to educate the public about winter air pollution. In May 1997, the CRC in Christchurch started an education campaign entitled, 'Christchurch is our living room, let's not fill it with smoke'. Two different sized pamphlets were produced which discuss the sources of winter air pollution, encouraging people to choose alternative heating sources and providing advice on how to operate woodheaters correctly. A smaller version of the pamphlet was circulated to 110 000 households in a mail drop. The CRC sent out 10 000 copies of an A4 size pamphlet to a variety of service centres such as libraries. In June 1997, the CRC released a consultative document entitled 'Let's take a deep breath' which was distributed to 5000 people who expressed an interest in air quality issues. There were two smaller versions, a brochure and pamphlet that summarised the content of the consultative document that were made available. During the

winter of 1997, a mass media campaign was conducted including a series of television advertisements, radio announcements and advertisements in the print media.

In 1996, the CRC ran a campaign called 'Can you see the stars tonight?'. For this campaign, the Council produced a poster with stars above a smoggy layer which had figures of gravestones above a city at night. This poster was distributed in conjunction with a radio campaign that started with children singing 'twinkle, twinkle little star' followed by information and then a request by the CRC for the public not to use coal, open fires and pre-1989 woodheaters when the Council advertise the pollution potential as high. Every winter the CRC has a pollution potential forecast which is sent to radio stations, television and the press. Each Friday the press publish daily pollution (PM10) concentrations for the week indicating if it had been a high or low on a graph. The CRC has a telephone line available that the public can ring to check on the daily pollution potential forecast.

2.2 ADVERSE EFFECTS OF WOOD-SMOKE

The previous sections have introduced the wood-smoke pollution problem in Australia and discussed the control option of improved operation. The efforts made in Australia and overseas to educate the wider community on these operation techniques have been reviewed. The following Section (2.2 to 2.2.4) examines why wood-smoke pollution is a problem in terms of both environmental and health impacts. Included is a discussion on the research data available on the health effects of wood-smoke and particulate air pollution that draws conclusions about the legitimacy of concern.

Wood-smoke has a number of effects on society: it decreases the aesthetic qualities of an area; it physically decays buildings; and it has impacts on public health. In the past, some people perceived wood-smoke as benign and thought the sight of smoke from a chimney was aesthetically attractive (Todd and Singline 1989:49). However, in recent years, this type of attitude in the community is less common. Today, many believe that high levels of wood-smoke decrease the aesthetic and environmental qualities of the urban region. In fact, the most common reason for public complaint about air pollution to the Hobart City Council in recent years has been about the effects of wood-smoke on aesthetics (LGA TAS 1997:8).

Wood-smoke, along with other forms of air pollution, causes building stones to crumble and discolours paints. Repairing this damage is a considerable financial cost to the community. These problems are significant but the main concern regarding wood-smoke pollution in the air is the impact it may have on public health.

2.2.1 Health impacts of specific wood-smoke constituents

Many of the constituents of wood-smoke are known irritants of mucous membranes in the human body and may aggravate existing respiratory diseases. The wood-smoke particulates are approximately 5 microns or less in diameter, small enough to be inhaled and lodged deep in the lungs. The wood-smoke particulates are composed of a complex mix of organic compounds which can be respiratory irritants and some are known carcinogens (Todd 1996:23). Epidemiological research in the field of environmental health is gradually building a case for the potential adverse health effects of wood-smoke on humans and is suggesting that exposure to this source of air pollution be kept to a minimum (Pierson *et al.* 1989:339; Larson and Koenig 1993:19).

The chemical composition of the emissions produced by wood burning are complex. There are, however, a number of specifically important pollutants including carbon monoxide, sulphur oxides, nitrogen oxides, aldehydes, polycyclic aromatic hydrocarbons including benzo-a-pyrene, and fine particulate matter that will be described in greater detail below.

2.2.1.1 Carbon monoxide

Carbon monoxide is an odourless and colourless gas that is formed by incomplete oxidation of carbon fuels. Consequently, it is a byproduct of the incomplete combustion of wood. Major sources in our society include tobacco smoke and transportation. When inhaled, it has a higher affinity for haemoglobin than oxygen and it successfully competes with oxygen to bond with haemoglobin in red blood cells where it forms carboxyhaemoglobin. This can be very hazardous because, at sufficient levels, it can deprive the body of oxygen (Pierson *et al.* 1989:341). Carbon monoxide (CO) at low concentrations (10 to 50 parts per million) causes headaches and increases reaction times. It can cause angina and impair vision. At

high concentrations (300 to 500 parts per million) it causes coma and death (Todd 1990:1938).

2.2.1.2 Nitrogen oxides

Nitrogen can form a number of gaseous oxides. Those present in wood-smoke at low levels are nitric oxide (NO) and nitrogen dioxide (NO_2). These oxides result from oxygen rich combustion of wood, coal, natural gas, or oil. NO has a high affinity for haemoglobin and forms methaemoglobin. NO_2 is thought to effect enzyme activities in the body and may cause membrane injury. It has been associated with pulmonary oedema, bronchoconstriction, and increased infection rates (Pierson *et al.* 1989:341).

2.2.1.3 Sulphur oxides

Sulphur dioxide is a known airway irritant present in wood-smoke at very low levels. It is a colourless, pungent, irritating, and reactive gas that is highly soluble in water. Exposure to sulphur dioxide can produce an acute respiratory response of coughing and wheezing. It can aggravate asthma and other respiratory illnesses (NEPC 1997:24).

2.2.1.4 Aldehydes

Formaldehyde is a common air pollutant in the environment. It has a distinctive odour and its effects include irritation of the eyes and mucous membranes of the upper respiratory tract. This highly soluble and rapidly metabolised pollutant is readily absorbed in the upper airways but rarely invades the lower respiratory tract unless inhaled when smoking. It is suspected to be carcinogenic (Pierson *et al.* 1989:341).

2.2.1.5 Polycyclic aromatic hydrocarbons

When wood is heated, volatile organic compounds (VOCs) such as benzene, aldehydes, phenols and organic acids, are released. These compounds are largely responsible for the smell associated with burning wood. There are also semi volatile organic compounds released, such as polycyclic aromatic hydrocarbons (PAHs). These PAHs require extremely high temperatures in order to burn and, therefore,

incompletely burnt hydrocarbons can be present in wood-smoke (LGA TAS 1997:7). One of the polycyclic aromatic hydrocarbons, benzo-a-pyrene, is a proven carcinogen and others are suspected carcinogens (Pierson *et al.* 1989:341).

2.2.1.6 Particulate matter

Particulate matter refers to any airborne dust, dirt, smoke or droplets occurring as a result of natural events or human activity (Neher and Koenig 1994:1398). Any airborne particulate matter between the size of 0.02 to 10 μm (designated PM10) has been shown to be of concern to public health. These size particles can travel deep into the lower respiratory tract and are not stopped by the usual physiological defence mechanisms in the nose and throat (Larson and Koenig 1993:18). Some remain there indefinitely and can promote morphological and biochemical changes in the lungs (Pierson *et al.* 1989:341). Wood-smoke from woodheaters contains substantial amounts of particulate matter that fall below 10 μm in size.

2.2.2 Research findings about adverse health effects of wood-smoke

This section discusses the relevant information currently available in respect to wood-smoke and adverse health effects. Research into this field comes from three primary sources; animal studies, occupational studies, and epidemiology. The laboratory experiments expose animals to wood-smoke and look for the presence of disease or changes in chemistry and behaviour. The occupational studies focus mainly on effects experienced by bushfire fighters. Epidemiological studies of exposed human populations are used to look for associations between exposure and various diseases.

Improvements have been made in reducing emissions and atmospheric conditions of the soon to be regulated pollutants, including lead, particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, and ozone in Australia. However, for the time being at least, the impact of air pollution on health remains significant. Children are thought to be more susceptible to air pollution because of their developing immune systems, the smaller diameter of their airways and increased relative metabolic rates. Also susceptible are people with existing respiratory problems and those with serious cardiopulmonary disease. Why sufferers of serious cardiopulmonary disease have

increased susceptibility and the mechanisms which cause this are currently unknown (Larson and Koenig 1994:146).

When dealing with the possible health impacts of wood-smoke on humans it is necessary to appreciate that the concentrations of pollutants are largely on the limits of detectable health effects. What researchers do know is that there are individuals who experience mild health effects such as headaches and eye irritations due to air pollution, and for a very small number of people (perhaps one person in 100 000), poor air quality is contributing to their deaths (Schwartz 1993:1137). However, the reality is that because health impacts are difficult to detect, the evidence from studies can be ambiguous, with some studies showing significant problems and others not. These types of findings suggest there is probably a small, but real, health risk.

It is very difficult to establish a causal link between air pollution exposure and health risks because of the nature of epidemiological studies and their inherent constraints. In order to establish a strong association between exposure and disease, there must be a large relative risk. The results of studies must be strong, specific and consistent across different populations and in different regions. For a true causal relationship to be established, there also needs to be a temporal link between exposure and effect and a dose related response to exposure, a biologically plausibility must be established and coherence amongst the studies must exist (Vedal 1997:552). Clearly, it is not always possible for every criterion to be fully, and extensively, met for an association to be regarded as causal. However, the scientific community do scrutinise and continue to persist in trying to meet all the criteria before definitively supporting a causal relationship. The many years of studies that finally and definitively identified a link between cigarette smoking and cancer is a good example (Vedal 1997:552). Further, there are always confounding factors that need to be controlled in epidemiological studies. The degree to which factors such as nutrition, social class, genetics, weather conditions, tobacco use and occupational chemical exposure contribute to the overall results must be fully addressed, yet often are not (Vedal 1997:568).

2.2.2.1 *Animal toxicology studies*

There are very few studies examining the acute effects, and none on the possible chronic effects, of wood-smoke inhalation in animals. A summary of the main ones is presented in Table 2.2.

Table 2-2 Summary of significant animal studies into the effects of wood-smoke.

Author	Year	Procedure	Results
Beck & Brain	1982	Impact of wood and coal smoke on guinea-pig lungs.	More adverse effects recorded from coal smoke. Depression in macrophage activity, damage to cellular membranes and increased red blood cell numbers.
Thorning	1982	Inhalation of wood-smoke in rabbits.	Tracheobroncial epithelial cell injury. After 24 hrs, ciliated cells and secretory cells were almost destroyed. After 72 hrs, cells began to recover.
Brizio-Molteni	1984	Inhalation of wood-smoke in dogs.	Increases in angiotensin-1 converting enzyme. Could lead to pulmonary hypertension.
Fick	1984	Wood-smoke on pulmonary macrophages in rabbits.	Pulmonary macrophages increased in number but their adherence and antibacterial activity was depressed.
Wong	1984	Wood-smoke inhalation on guinea-pigs	Reported a blunted response to CO_2 levels and may suggest a disruption of neural control mechanisms.
Clark	1990	Acute wood-smoke inhalation in dogs.	Increase in extravascular lung fluid

Adapted from: Larson and Koenig 1993

The results of animal studies suggest that wood-smoke can cause depression in pulmonary macrophage activity, disruption in respiratory neural control and damage to cellular membranes and epithelial cells (Larson and Koenig 1994:151). However, the findings of the animal studies are not easily extrapolated to humans for a number of reasons. Firstly, the concentration levels to which the animals were exposed were far greater than those to which people are exposed in their daily lives. Secondly, in all the studies, the wood-smoke is instilled directly into the lungs of the animals, rather than inhaled during normal breathing.

Much of the research has examined mechanisms which the body has developed to cope with very high exposure to foreign gaseous materials and has little direct information on the health effects of wood-smoke in the atmosphere on humans. Finally, the animal studies, unlike the epidemiological studies, evaluate the pulmonary function or look for symptoms of respiratory illness, so little comparison can be made between the results. However, these sorts of studies are important in the long-term because, ultimately, they assist in improving the understanding of the mechanisms by which smoke may be affecting our bodies.

2.2.2.2 Occupational studies - bushfire fighters

There is little research in this area. However, Rothman *et al.* (1991)(as cited in Larson and Koenig 1993:13) studied the seasonal changes in the pulmonary function of a number of bushfire fighters in California. Compared with the beginning of the season, there were significant decreases in pulmonary function and respiratory symptoms in the firefighters at the end of the season. There were also significant changes in eye irritations and phlegm production between the beginning and the end of the season.

2.2.2.3 Studies in developing countries

The findings of studies conducted in developing countries generally refer to adults and children exposed to high levels of wood-smoke for long periods in confined and unvented spaces. Studies of this nature have been consistent in the general findings that extended exposure to wood-smoke in confined spaces will have detrimental effects on health (Larson and Koenig 1993:13). Women who spend extended periods cooking on open unvented indoor fires have increased respiratory problems and decreased pulmonary function. For example, women in rural Mexico spend around 60 percent of their time indoors primarily in the kitchen. Often, because of severe shortages in wood, other biomass sources are used (for example cow dung, corn stalks and husks) which have lower energy contents and produce more emissions per weight of fuel (Brauer *et al.* 1996:104). Studies conducted in New Guinea, India and Nepal, have all reported that wood-smoke exposure can cause increased respiratory symptoms and increased chronic bronchitis in those exposed for long periods (Larson and Koenig 1994:145).

2.2.3 Epidemiological studies of adverse health effects of wood-smoke

Due to evidence about the effect of tobacco smoke on children's respiratory health, researchers were predicting that people, and particularly children, were likely to be vulnerable to inhaled agents in wood-smoke. Some of the recent studies in the United States specifically looking at wood-smoke and lung function in children and adults are displayed in Table 2.3.

Table 2-3 Summary of significant studies into the health effects of wood-smoke on humans.

Author	Year	Subjects	Endpoint measured	Results
Tuthill	1984	5-11 yrs 258 w/stoves 141 without	Symptoms	No significant increase in risk.
Honicky	1985	1-7 yrs 34 w/stoves 34 without	Symptoms	More symptoms in children with stoves.
Browning	1989	1yr + 455 high smoke area 368 low smoke areas	Symptoms Disease prevalence	No statistically significant difference between groups. Trend in 1-5 yrs in high smoke area.
Butterfield	1989	1-5yrs 59 children	Symptoms	Sign correlation btw woodstove use and wheeze + cough.
Johnson	1990	8-11yrs 495	Spirometry	Lung function decreases with increase TSP.
Morris	1990	<24 months 58 pairs, 49% with w/stoves	Respiratory disease	W/stove sign. risk factor for lower resp. tract infection
Heumann	1991	8-11yrs 410 Grade 3-6	Spirometry	Sign. decrease in pulmonary function in high smoke areas.
Koenig	1993	8-11 yrs 296 health grade 3-6 30 asthmatic grade 3-6	Spirometry	Sign. assoc. btw fine particles and lung function in asthmatics in high smoke areas.

Adapted from: Larson and Koenig 1993

The studies presented in Table 2.3 all specifically investigated the impacts of domestic wood-smoke on human health. The majority of these studies reported an association between adverse respiratory effects and wood-smoke exposure in young children. Therefore, there is enough evidence to suggest the need for further research into domestic wood-smoke health effects. As previously mentioned in relation to epidemiological studies, an attempt must be made to meet a number of

criteria before a conclusive decision can be made about causation (see Section 2.2.2). In the case of these studies into domestic wood-smoke impacts on health, a number of criteria have been met such as consistency, coherence and plausibility. Therefore, the data do suggest that there may be a causal relationship between elevated wood-smoke and adverse respiratory effects in children, which, therefore, deserves further investigation.

2.2.4 Epidemiological studies of adverse health effects of fine particles

Another field of research which provides evidence of the likely adverse effects of wood-smoke involves studies conducted into air pollution and particularly into the impacts of fine particulates like those found in wood-smoke. A large number of epidemiological studies into fine particles in the atmosphere have found a relationship between particulates and mortality. For example, in the United States recent research has found that, for every 10 $\mu g/m^3$ increase in fine particles, measured as PM10 over 24 hours, there is a 1 percent increase in mortality. In Europe, this increase was found to be only 0.5 percent, but still significant (Vedal 1997:558; Schwartz 1993:1138; NEPC 1997:151). The results of many studies have observed a 1 percent increase in hospital and emergency room visits per 10 $\mu g/m^3$ increase in PM10 for all respiratory illnesses, while the observed increases for asthma are 2-3 percent. Observed lag periods for hospital attendance indicate that the effects are probably cumulative (NEPC 1997:151). In New Zealand, the ambient air quality guideline for PM10 is 120 $\mu g/m^3$, averaged over 24 hours. In New Zealand, calculations over two years, 1992 and 1993, indicated that PM10 concentrations may be associated with 21-29 deaths per year in Christchurch, 8-11 hospitalisations for respiratory diseases and 14-17 hospitalisations for cardiopulmonary disease (CRC 1996:14).

Despite the wealth of epidemiological data associating acute exposure to particulate air pollution, there are still important criteria for establishing causation that have not been conclusively proven, such as the mechanism whereby particulates are increasing mortality (Vedal 1997:573). The data in relation to exposure-response relationships can not, at this stage, provide a threshold of particulate concentration where no relationship is apparent. This obviously complicates attempts to define a concentration cut-off point for setting standards. At this stage, the evidence suggests

that it is not the chemical composition of the particulates but the mass of fine particles in the air that is critical. Clearly, the situation is complex and studies are still emerging with differing findings. The role of confounding factors, such as meteorological factors, also needs to be explored further.

The debate regarding the impacts of fine particulates on health is not over. However, there is sufficient evidence for researchers to contend that a causal effect of particulate air pollution on mortality provides the best explanation for the general results found to date (Schwartz 1993:1145). Consequently, governments in Australia and the United States, are examining their current controls on fine particulate concentration. Australia is likely to impose a new Australian National Standard for fine particulates (PM10) of 50 $\mu g/m^3$ (averaged over 24 hours). Also, the Australian and New Zealand Environment and Conservation Council have commissioned a report on the state of knowledge of fine particulates that will be available in 1998 (Todd *et al.* 1997:5).

In summary, the preponderance of data from research on the adverse effects of wood-smoke from developing countries, together with epidemiological studies on wood-smoke and fine particulates exposure, suggests that wood-smoke and fine particulates in wood-smoke are, most probably, adverse for public health. Clearly, further research needs to continue to explore the mechanisms by which wood-smoke could be affecting our health, and the exposure levels of wood-smoke that are safe. The evidence collected so far, is enough to recommend aiming to minimise human exposure to wood-smoke.

In order to get this message across to the public, and to motivate them to use woodheaters correctly in order to reduce wood-smoke levels, the case study in this thesis incorporated information about the possible health impacts of wood-smoke into the education kit that was given to the neighbourhood groups.

2.3 THE ROLE OF NEIGHBOURHOOD AND COMMUNITY GROUPS IN ENVIRONMENTAL EDUCATION

How to address the urban wood-smoke problem in Tasmania and in other trouble spots in Australia, is a matter of concern for all levels of government and for an increasing number of concerned citizens. As stated in Section 2.1.4, many approaches are possible including better designed heaters, education on how to

operate heaters correctly, more strict enforcement of existing legislation, and encouragement to replace old smoky heaters. Community education, as a means of reducing environmental harm, is a particularly interesting option. In theory, it could be an extremely cheap and effective option, but the outcomes are not as predictable as introducing a new technology or banning the use of polluting appliances.

2.3.1 The role of community groups in environmental management

In Australia, in recent years, there has been a proliferation of groups that are specifically involved in environmental stewardship (Carr 1994:5). Such groups include Landcare, Coastcare, catchment management groups, water monitoring groups, and air monitoring groups. These voluntary community groups have important roles in environmental management. They can be a catalyst for change and for increasing the identification and awareness of environmental issues or problems. They provide a means for environmental education in schools and the greater community, and provide a source for information and skills transfer. These groups have a role in lobbying by expressing the views and needs of the community to government and a role in administration and facilitating consultation with other groups. The groups have a stewardship role and, in some circumstances, provide practical hands-on work and active environmental protection. These groups encourage involvement and participation within the wider community and influence others within the group and establish group norms. They encourage community cohesion, as people work together towards common goals, and illustrate that collective action can be greater than individual action (Carr 1994:30).

It could be argued that messages from these types of environmentally based community groups are ignored or soon forgotten. However, the grass roots success of suburban recycling, Landcare, and Coastcare suggests that the public can 'do the right thing' if properly informed and motivated. Unfortunately, information is not readily available on the success levels of all the various community groups involved in environmental stewardship. However, there have been specific studies into Landcare groups and their activities.

For example, Curtis and De Lacy (1995:46) who have undertaken a number of state Landcare evaluations, reported that Landcare has been very successful in mobilising community cooperation and there is considerable evidence of program effectiveness.

Their statewide findings indicate that the mean membership is 29.4 people and, as there were 2 200 groups in 1995, this suggests that Australian Landcare membership is around 65 000 and reveals the vast scale of community participation in Landcare. Curtis and De Lacy (1995:46) also found that, in Victoria and South Australia, more than half the Landcare members participate in each group activity, indicating a high level of member involvement. Landcare groups' efforts in revegetation, fencing water courses, and establishing perennial grasses on steep hills have been significant. For example, in 1993, the 400 Victorian Landcare groups planted 2.5 million trees and shrubs and erected around 3,000 kilometres of fencing. Landcare respondents are reported to have had significantly higher levels of awareness and knowledge of all land management issues and topics than non-Landcare participants. Overall, the researchers' findings suggest that the government funding of Landcare is an effective approach to agricultural extension (Curtis and De Lacy 1995:53).

This thesis argues that, in addition to community groups specifically oriented towards environmental issues, established voluntary neighbourhood groups and community organisations which have no orientation towards environmental issues can be involved in environmental management and undertake all of the above roles on different environmental issues.

2.3.2 Established neighbourhood groups

The establishment of voluntary community groups in response to social, economic and environmental problems has always occurred. These groups form as people band together to deal with problems that affect their local community. The types of groups established are vast and diverse. For example, they include groups that are related to health, sport, environment, arts, support groups and neighbourhood associations like Neighbourhood Watch and Progress Associations.

Social researchers, Florin and Wandersman (1990) have identified a number of characteristics that voluntary community organisations have in common. They are geographically based and their primary resource is "human capital", that is, their members. Monetary resources are modest and paid staff are generally non-existent. These groups are locally initiated and are generally formed by local residents responding to local conditions. Residents come together because they may have a

mutual concern and a conviction that, collectively, they can improve a problem for the local community. As Florin and Wandersman (1990:44) state:

> 'at their best, voluntary community organisations transform isolated individuals into public citizens and they can provide a human-scale sense of place, purpose and process in today's mass society'.

The types of groups that participated in the case study for this thesis were established neighbourhood groups including Neighbourhood Watch, Progress Associations, Child Health Associations and the National Council of Women. All of the community groups recruited to participate in the case study had the common characteristics stated above and specific mission statements or goals that initiated their formation (see Table 3.1).

Working with volunteer community groups is destined to be reasonably complex and unpredictable. All of the groups selected in this case study had emerged out of various community concerns and had no environmental orientation or interest. However, they were either concerned about issues that affected their local community or were specifically concerned about health issues. It was hypothesised that if information pertaining to the wood-smoke problem was presented to the groups in a manner that emphasised its relevance as a community concern, the groups may take it up as it affected their local community's environment and public health.

2.4 INFORMATION EXCHANGE

Knowledge, data and research findings alone do not always suggest a direction for actions that need to be taken. It is when the knowledge or findings are placed in a meaningful context that they can become useful information (Carr 1997:3). It can be argued that to 'extend' or 'transfer' that knowledge means it is a one-way delivery of information, whereas 'exchange' implies a concept of two-way dialogue where there is equality between the participants discussing the information. In this study, it was hoped there would be an exchange of information between the researcher producing the wood-smoke education kit and the neighbourhood group members. It was also hoped there would be an exchange of information that allowed informed discussions

on the topic amongst the group members themselves and ultimately there would be a transfer of wood-smoke information to the wider community through the group's actions. It was thought that the group's local knowledge, such as their collective wisdom about the local culture, and their established community networks, would assist them in their transfer of the information and develop a multiplier effect. Social theory supports the use of community groups and existing neighbourhood networks to enhance the effectiveness of information campaigns and achieve more long-term changes in behaviour (Rogers 1995; Burns 1991; Stern 1992; Weening *et al.* 1990).

2.5 RATIONALE FOR EDUCATION THROUGH ESTABLISHED VOLUNTARY NEIGHBOURHOOD GROUPS

The rationale for using neighbourhood groups in the dissemination of information on the correct operation of woodheaters was drawn from a number of disciplines and theories. It takes inspiration from work done in the fields of sociology, public health, environmental psychology and communications, in particular, diffusion research. The field of diffusion research is a particular type of communication research which is trans-disciplinary and has developed from, and with, the aforementioned traditions, as well as archaeology, geography, marketing, education and rural sociology. Diffusion research is concerned with the process of diffusion of a new idea or new practice and how it is communicated through certain channels over time among members of a social system (Rogers 1995:5).

2.5.1 Environmental education and persuasive communication

Education campaigns are one of the most common ways used to induce environmentally responsible behaviour. A large proportion of these campaigns work on the assumption that if people are supplied with environmental information they will automatically change their attitudes and, therefore, their behaviour. Unfortunately, it is never as simple as that and people are more complex as are environmental issues. For example, the pro-convenience attitude of an activity may override a pro-environmental attitude that a person may hold. People may not know how to perform an environmental action whether it be using a woodheater correctly or which bottles and containers are appropriate for recycling. The social norms of

their friends, family and acquaintances may encourage or support behaviour which is contrary to that promoted by the new pro-environmental attitude that a person may have adopted (Burn 1991:615).

All of these factors impact on whether a pro-environmental attitude and/or behaviour is taken up by an individual. It is important that researchers involved in increasing the appeal of environmental education are aware of the principles and processes involved in persuasive message transfer. Researchers have commented that many environmental information programs have failed because they simply made information available, without serious effort to use psychological techniques to get the intended audience to pay attention (Stern 1992:1227; Dennis *et al.* 1990:1109). These principles have long been used to increase success in marketing and advertising. Environmental education campaigns should also attempt to utilise this type of information (Burn 1991:615).

Social psychology has gained considerable insight into the processes that are at work in people's minds when they are exposed to persuasive communication and it can be helpful in terms of constructing an effective message (Fishbein and Manfredo 1992:30). Social psychology suggests that there exists an interconnectedness of attitudes, cognition (beliefs and knowledge), feelings, behavioural intentions and actual behaviour. Attitudes affect our thoughts and perceptions, and a change in attitude often sets the stage for behavioural changes (Zimbardo and Leippe 1991:31). When presenting information, it is important that people feel it is personally relevant, that they have the confidence to carry out the new skills they have learnt, and that the recipient of the new message has the motivation and ability to evaluate and understand the message. Under these conditions, the information is more likely to be remembered and affect behaviour (Syme *et al.* 1987:445; Petty *et al.* 1992:78). If these elements are not present, even if attitudinal and behavioural change is attained, it is less likely to have a long-lasting effect (Petty *et al.* 1992:97). Therefore, seeking a suitable forum where information can be presented with these elements in mind is important if people's behaviour is to be influenced in the long term, be it in relation to air pollution, energy conservation or any other environmental issue. It is argued here that established neighbourhood groups can potentially provide this suitable forum.

2.5.2 Paths of information-processing

There are numerous theories on the paths of information-processing that people carry out when presented with new information. Diffusion research has brought together many of the points shown to be critical in information-processing from these fields and called it the 'innovation-decision process' (Rogers 1995:54). This thesis uses the theory of information-processing presented in diffusion theory as a base but elaborates on it, with work from sociology and psychology.

Information-processing is the means whereby an individual passes from the initial knowledge phase to forming an attitude towards the topic, then deciding to adopt the idea or not, implementing it, and finally a confirmation phase. At each of these phases, there are factors that can be manipulated in order to influence the effectiveness of a new message or idea on the receiver. Also important are the components of the new idea or message itself in determining the likelihood of adoption of an idea.

2.5.2.1 Components of the new idea or new practice

The rate of adoption of a new idea can depend on the following characteristics; relative advantage, compatibility, complexity, trialability, and observability. Relative advantage refers to whether the receiver of the message perceives the new idea as advantageous, in terms of economics, convenience, social prestige or satisfaction. Compatibility means the degree to which the idea is consistent with their existing values, their past experiences, and norms. Complexity refers to the difficulty in understanding the new idea. Trialabilty is the degree to which the new practice or idea is suitable for a trial. Finally, observability is the degree to which the results of the new practice are visible to others. Past research has found that these five components are important characteristics explaining the rate of adoption of a new idea or practice (Rogers 1995:16).

2.5.2.2 Components of the correct operation of woodheaters message

In the case study, the new message or idea being conveyed to people was the importance of using woodheaters correctly and the clear course of actions to do so. This message may or may not be new information for some of the recipients of the information and this will impact on the effectiveness of the message (see Section

2.5.3.1). The practice of correct operation has a number of relative advantages. Firstly, running a woodheater correctly is more efficient and, therefore, it is financially advantageous. However, the skills to run a woodheater correctly are not necessarily convenient and will require, particularly initially, more attention paid to managing the appliance.

In terms of compatibility of the new information with previous knowledge on the topic, it was difficult to estimate whether people who were presented with the materials in the education kit had any prior knowledge on the topic. In Hobart, and particularly in Launceston, the issue of wood-smoke has been regularly presented in the media over recent years. Some participants in the case study would have, for example, been exposed to the television advertisements and info-postcards associated with the Commonwealth Government's 'Breathe the Benefits' education campaign (see Section 2.1.5.1). In the case study for this thesis, an attempt was made to assess the levels of previous knowledge on the topic (see Section 3.8.1).

In terms of complexity of the message, efforts were made during the development of the information kit to ensure that the content was easy to comprehend and assimilate with other knowledge. In the development of the materials, a focus group was run to pre-test the level of comprehension of the pamphlet. An effort was also made during the study to test the levels of comprehension of the other educational materials (see Section 3.8.1).

The idea of correct operation of woodheaters, is amenable to trialability. If people were to follow the clear steps, they would find that the amount of smoke they produced would be reduced. The only problem is that woodheater owners might be unaware of the smoke levels they currently produce and, therefore, would not be able to quantify the changes. However, in most cases, particularly with newer heaters, correct operation should create only a heat haze and no smoke, which would be an obvious improvement.

It is estimated that most of the current wood-smoke problem is caused by a small proportion of residents. Between 17 percent and 20 percent of heaters are producing about 33 percent of the smoke produced by heaters (Todd *et al.* 1997:22; ACC 1997:12). This means that, in terms of observability, unless an entire area acted to operate woodheaters correctly, there may be only minimal observable changes. This

could be a considerable problem in getting other people to become involved in better operation practices. It also means it is critical that the message gets through to the major offenders who are producing lots of smoke, or else the majority of woodheater owners will not see changes.

Finally, researchers must be aware of the 'type' of message being transferred. The message of using woodheaters correctly to reduce wood-smoke, is a *preventative message*. A preventative message is an idea or practice that individuals adopt in order to avoid the occurrence of an unwanted event in the future. Some examples of other preventative messages include, getting women to have mammograms or pap smear tests, quit smoking campaigns, and taking actions to prepare for bushfires. The problem with these types of messages is that people perceive that the undesired event, be it a bushfire or a bad wood-smoke day, that may affect our air quality and our health may or may not occur if the new practice is undertaken. The individual may not perceive the need to take up the practice, and consequently, the motivation to adopt the action is weak. The rate of adoption of these types of messages is relatively slower than for non-preventative messages (Rogers 1995:171).

Thus, there are innate aspects of the new idea or message which will affect the likely success of the message and its acceptance. Information-processing theory presents the phases individuals who are exposed to the message will undergo. In order to increase the success or take-up rate of the information on correct woodheater operation, it is important to understand what factors influence the theory of information-processing.

2.5.3 The process of information-processing

2.5.3.1 Knowledge

The first phase in information-processing is an individual's exposure to the message. If a person never hears or sees the new information it cannot affect attitudes or behaviour (Zimbardo and Leippe 1991:137). People must also pay attention to the information, so it is important that the presentation be vivid and salient (Dennis *et al.* 1990:1115; Stern 1992:1227; Zimbardo and Leippe 1991:137). Most important is that the new knowledge contained in the message is understandable, particularly

the conclusion or main points. These main points must then be accepted before there will be attitudinal change (Zimbardo and Leippe 1991:137).

The knowledge needs to not only increase awareness of a problem or new idea but also needs to be 'how to' knowledge - telling people how to use it correctly. Rogers (1995:166) noted that many 'change agents' concentrate their efforts on creating awareness-knowledge whereas they should place more emphasis on the how-to knowledge. In this case study, the wood-smoke information was placed in a context, but a greater proportion of the information was on the steps and techniques to operate woodheaters correctly.

People have a tendency to consciously, and unconsciously, avoid messages and information that are in conflict with their own opinions on a topic. This tendency is called selective exposure (Zimbardo and Leippe 1991:137; Rogers 1995:164). The major reason this is done is the built-in filtering systems in our society and social networks. In addition, discrepant messages are sometimes avoided because of cognitive dissonance. Cognitive dissonance refers to the internal conflict people face when they have inconsistent internal beliefs. The best example is smoking, where people know smoking is bad for their health, yet they self-justify their actions (Zimbardo and Leippe 1991:107). The problem with this is that people who already have a considerable knowledge base and attitude on a topic that is inconsistent with the new message will be less influenced by the message. Conversely, those who have a belief consistent with the new message will be influenced even more than the person exposed to the information for the first time (Zimbardo and Leippe 1991:151).

In the case of woodheater operation, a good proportion of people have established views on how to operate woodheaters. In Tasmania, within the general community, there is an established culture of woodheater users whom preceding generations have taught how to operate heaters incorrectly. Many people feel very confident about their operational techniques and others proudly tell how their friend or relative altered their heater so it will burn overnight better. So it is necessary to recognise these types of barriers to successful dissemination of the information. On the other hand, if the neighbourhood group members who are part of the study have consistent

views with the woodheater message, they may be influenced more and so feel even more inclined to take on the issue and be empowered to do something about it.

It is also critical that people not only understand the information but that they cognitively process and assimilate it into their current belief systems. It has been found that when comprehension of a new message is impaired, attitude change is reduced (Zimbardo and Leippe 1991:148). The level of active analysis and assimilation of new information can be influenced by the receiver's motivation (how personally relevant the message is to the individual) and their ability (how distracted they are) to process the message. Therefore, if a receiver of new information thinks it has low relevance to them and they are distracted or disinterested then the effect of the message on their attitudes and behaviour will be less. People must also feel sufficiently confident about carrying out the skills necessary to participate in the new practice (Zimbardo and Leippe 1991:167). Therefore, in order to gain acceptance it is important that as much as possible is known about the attitudes, knowledge and skills of the potential audience (Zimbardo and Leippe 1991:150).

2.5.3.2 Persuasion

The next stage in information-processing is persuasion. During this phase, the message is either accepted or rejected by the receiver and an attitude towards the topic is formed. It is during this phase that the type of information channel utilised to transfer the new information can make a significant difference. There are generally two categories: mass media such as radio, television, and newspapers, where a huge audience can be reached by a source of one or more individuals; and interpersonal channels, involving more personal face to face exchange between two or more individuals (Rogers 1995:203).

One of the preferred methods used by governments to educate the community about environmental issues is mass media campaigns. These may take the form of creating and disseminating public education materials, television advertisements, radio announcements and newspaper articles. These messages reach millions of people, but do they change people's behaviour? Research suggests that they are an important tool for creating awareness-knowledge but they lack the power of persuasion, and by themselves they usually have a weak affect on attitudes and

actual behaviours (Constanzo *et al.* 1986:526; Syme *et al.* 1987:445; Zimbardo and Leippe 1991:342; Weenig *et al.* 1990:28; Rogers 1995:195).

One of the reasons mass campaigns may have limited success is their inevitably general nature. Mass media messages are too general to provide the reinforcement an individual needs to adopt a new idea or practice (Rogers 1995:168). In many cases, the message does not meet specific situations, characteristics, and needs of the target groups. Specificity was found to be important by Oskamp *et al.* (1991), who reported that, as in much of the attitude-behaviour literature, having general pro-environmental attitudes did not predict kerbside recycling, but attitudes specific to recycling did. Therefore, campaigns to promote certain environmental behaviour need to concentrate specifically on awareness and favourability of those activities (Oskamp *et al.* 1991:517). Mass media channels can: (1) reach a large audience; (2) create knowledge and spread information; but (3) lead to changes only in weakly held attitudes. Rogers (1995:195) writes that 'mass media information channels are relatively more important at the knowledge stage and interpersonal channels are relatively more important at the persuasion stage'. To enhance the effectiveness of information campaigns, it has been argued by diffusion theorists and many others (Weenig *et al.* 1990:28; Zimbardo and Leippe 1991:140; Rogers 1995:169), that attempts be made to approach groups on a small-scale basis in a natural social setting, such as local community organisations, instead of as separate individuals.

It has also long been known that a major factor affecting attitudinal and behavioural change is source or communicator credibility. Credibility is made up of trustworthiness and expertise in an area, and will influence how much people will believe and take notice of a message (Stern 1992:1228; Zimbardo *et al.* 1977:59). It is well known from research that information given by familiar acquaintances, family and friends has high credibility (Weenig *et al.* 1990:32). Because of these features, neighbourhood groups and grassroots organisations can provide the environment and interpersonal channels to develop and exchange effective messages and can serve as a strategy to overcome credibility problems.

Researchers examining the processes of information exchange have found that, within rural community environment care groups, new information is more likely to be readily accepted and used by a specific landholder if it comes from within their

own reference group. Also, landholders travelling to nearby regions have more 'success' exchanging their knowledge with other landholders than do government officers. They also report that, from the 'farmer's perspective', for information to be transferred, the deliverer of the information must not be too different (thereby not relevant) and not too similar (thereby a source of competition) (Carr 1993, as cited in Carr 1997:5). Rogers (1995:33) reported that information delivered through a landholder who was held in high esteem by others was more likely to spread quickly through a community. Diffusion research describes this phenomenon as homophily and heterophily communication networks. In essence it says that individuals with similarities in certain attributes such as beliefs, education, and social status are homophilous. There will be more effective communication when the source of a message and the receiver are homophilous. Interestingly, it has been found that some degree of heterophilous communication is often necessary for the diffusion of new information through the groups (Rogers 1995:157). New information must flow into such an interlocking network for information exchange to occur. In terms of this case study, the researcher acted as a heterophilous source of the information.

Interpersonal channels therefore: (1) provide two-way exchange of information and because of the personal nature of communication this can help overcome social barriers like selective exposure and cognitive dissonance, and (2), help persuade an individual to form or change a strongly held attitude. In this study, it is hypothesised that encouraging the groups to use the kit and take on the role of educators could capitalise on the advantages of using interpersonal channels in information transfer and exchange. It was also thought that the communication structures within the participating existing neighbourhood groups could have a catalysing effect on the impact and effectiveness of the wood-smoke information campaign.

By taking this community approach, the provided information can be more personal and better applicable to the groups needs and uses, and may result in the groups becoming more involved in the information program. Once involved, existing social communication networks could have a catalysing effect on the impact of the program. Social networks could be used to discuss the information with other members of the group, encourage others to participate generally, and result in an overall increased awareness of the program (Weenig *et al.* 1990:29).

2.5.3.3 *Group processes and communication*

The potential effectiveness of a group in exchanging information largely depends on the existing social structures and networks in the group. Researchers have examined these communication networks and identified a number of characteristics that help predict which groups will be more or less successful in information programs (Weenig *et al.* 1990:31). Networks within a group can be characterised as 'dense' if many mutual ties exist between members, or 'loose' if few ties exist and groups meet infrequently. The strength of these ties depends on the time members spend together, the emotional intensity, intimacy, and the amount of reciprocal communication between members. The strength of these ties has been found to be most strongly dependant on the immediate geographical distance between members and socio-economic status (Feld 1981, as cited in Weenig *et al.* 1990:31). Therefore, neighbourhood community groups potentially have some of the ingredients for strong communication networks. Both the strength and density of communication networks are important with respect to the potential success of an information program and the level of group involvement and are referred to as the quantity of ties within a group (Weenig *et al.* 1990:31). These types of community groups also have the potential to extend social influence which, in turn, can affect the extent to which attitude and behavioural changes will occur.

It has also been shown that, when people make a verbal or written commitment to participate in pro-environmental activities, such as recycling, they are more likely to participate in the action. It is thought that these individuals are motivated and have the desire to appear consistent among their peers (Burn 1991:615). Therefore, by neighbourhood groups agreeing to participate in the program it was possible the group members themselves would feel a sense of commitment to carry out the activity of using woodheaters correctly themselves.

The importance of social norms has been illustrated by previous research into recycling participation. Researchers have found that, by encouraging the development of 'block leaders' in a neighbourhood recycling program, there was increased recycling (Burn 1991:625; Hopper and Nielsen 1991:202; Nielsen and Ellington 1983:306). Individuals who already recycle were asked to deliver persuasive messages and recycling bags to non-recycling neighbours in order to

engender a recycling 'norm'. These recycling block leaders served as models, made behavioural alternatives salient, and provided information about the consequences of the behaviour. Personal contact with the block leaders was also thought to increase the likelihood of a person making a commitment to participate, which, as discussed above, increases participation in an activity (Burn 1991:617). Therefore, in this case study it is hypothesised that, if neighbourhood groups take on the role of being educators, these types of social influence benefits could effect the transfer and exchange of the wood-smoke information. Therefore, working through established voluntary neighbourhood groups has potential advantages, such as homophilous communication, strength and density of networks, and social influence on people, to improve the effectiveness of an information campaign.

2.5.3.4 Decision

The next phase in information-processing is the decision phase which occurs when a receiver of new information decides whether or not to adopt the new practice or idea. Usually, they will try out the practice for a while. If peers around them have adopted the practice this can act as a substitute trial and will increase the adoption rate (Rogers 1995:171). Therefore, working through neighbourhood groups, who will to a degree influence one another's behaviour, could be an effective way of getting practices adopted.

2.5.3.5 Implementation

The implementation phase is when, if the new practice has been adopted, there is overt behavioural change. During implementation of the new practice, people will probably have questions, and having access to information or peers to ask, can be important to maintain the new skills. Using neighbourhood groups as information disseminators means they are available for people to make further enquires and be an ongoing information source. Once they have become confident with the new action, it can become routine behaviour in a relevant situation.

2.5.3.6 Confirmation

Once a decision to adopt a new practice or idea has occurred and the person is participating in the activity, the process is not necessarily over. That person will still

be seeking reinforcement about their decision. Therefore, during this stage positive reinforcement can come from the information source or peers. Using voluntary neighbourhood groups as disseminators of information would mean the groups could continue to provide messages and encouragement to group members and the wider community about correct operation of woodheaters.

Clearly, the information process is based in theory and, in practice, is not going to occur every time, and by every person exposed to a new idea or message. However, it acts as a general outline of the steps developed through research in psychology, sociology and diffusion research. It provides us with an insight into the techniques that can be utilised to improve the likelihood of a new practice, such as correct operation of woodheaters being taken up by woodheater owners. It also supports the use of established voluntary neighbourhood groups in the dissemination of environmental information as a theoretically valid endeavour.

3 METHODS

3.1 INTRODUCTION

The case study conducted was composed of four inter-related 'projects' which, together, sought to ascertain the effectiveness of using established neighbourhood groups as a mechanism for education on wood-smoke and woodheater operation. Various methods were used to initiate, develop and evaluate each project. In order to assist the reader in visualising these connecting projects, a schematic representation of activities carried out in the case study is shown in Figure 3.1.

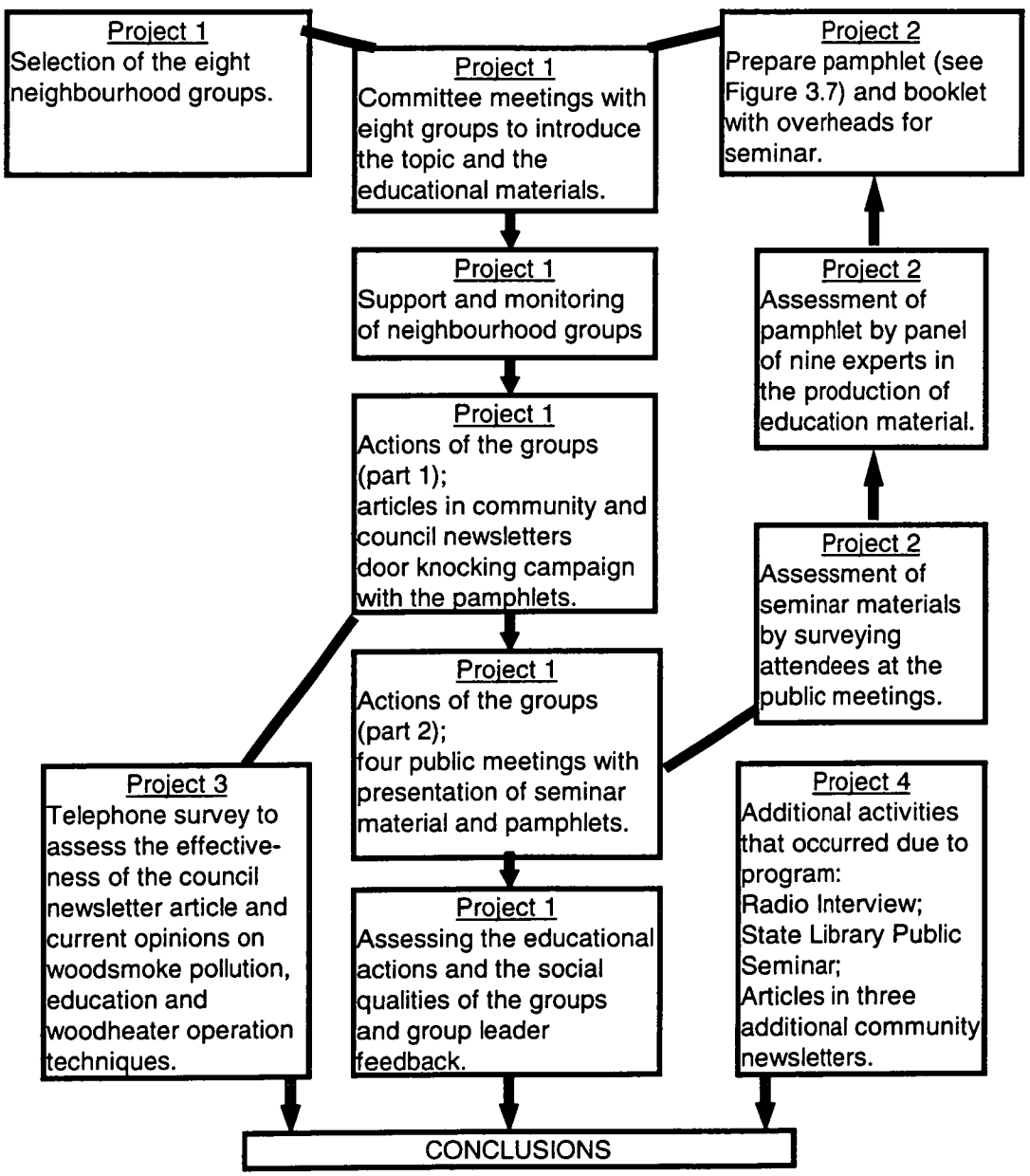


Figure 3-1 The components of the case study.

3.2 RESEARCH EVALUATION

Two types of evaluation were used to assess the success of the education program conducted as part of this case study: process evaluation and impact evaluation.

> 'Process evaluation, attempts to measure the activities of a program and who it is reaching' and 'impact evaluation, measures the immediate effects of the program (does it meet its objectives)' (Hawe *et al.* 1990:60).

The limited time-frame (March-November 1997) of the study meant that it was not possible to address outcome evaluation, which measures the long-term effect of the program (does it meet its goals). To conduct outcome evaluation, a study needs to be carried out over a number of years (Hawe *et al.* 1990:60).

Process and impact evaluation are often used during the development of an education program. They provide feedback to the researcher as to whether the program is reaching the right people and whether they were satisfied with it, enabling the researcher to decide whether or not the program is running in its best form. The projects undertaken in this thesis form a case study and in many ways they represent the early stages in the development of an education program. It should be considered that if it were possible to continue with the work, feedback from the findings of this study would be used to refine the program, and long-term outcome evaluation would be conducted.

The research technique utilised in this study can be referred to as 'field research', which includes methods such as case studies, participant observation and direct observation (Babbie 1992:285). The key strength of field research is the comprehensive perspective it can give the researcher through direct participation and observation of the social phenomenon (in this case, community-based education) under study. Field research typically yields qualitative data (Babbie 1992:285). In this study a combination of data types were collected, but a large proportion was qualitative.

As stated in Chapter 1, the researcher adopted a 'participant-as-observer' role during the study (as defined by Gold 1969, and cited in Babbie 1992:289). In this role, the researcher can participate fully with the group under study, but make it clear that they are undertaking research on the group. It was critical that the researcher not

lose scientific detachment and that at the same time, the groups did not get so focused on the research project that their usual behaviour was affected.

This chapter describes:

(1) the design and procedures used for execution of the case study,

(2) the methods used to involve neighbourhood groups and the assessment of their activities,

(3) the development of the educational materials,

(4) the evaluation tools used to assess the educational materials, including the pamphlet and seminars, and

(5) the quantitative research methods used to conduct a telephone survey of residents on wood-smoke pollution and education.

3.3 THE ESTABLISHED NEIGHBOURHOOD GROUP CASE STUDY

3.3.1 Subjects

Eight established voluntary neighbourhood groups in Hobart and Launceston participated in this study. In Hobart, these included the Lindisfarne-Rose Bay Progress Association, the Southern District Child Health Association, the National Council of Women Association, the Mount Stuart Progress Association and the Mount Stuart Neighbourhood Watch group. In Launceston, the West Launceston Neighbourhood Watch group, the Invermay East Neighbourhood Watch group and the Northern District Child Health Association participated.

3.3.2 Study sites

The study was conducted in the Tasmanian capital, Hobart, and the major regional centre, Launceston. The voluntary neighbourhood groups involved in the project were active in certain regional locations within these major centres. Table 3.1 describes the mission statements (the group's self-defined role in the community) of the groups. Figures 3.2 and 3.3 show the general location of the groups in Hobart and Launceston.

Table 3-1 The established neighbourhood groups, their general location and their mission statements.

NAME	LOCATION	MISSION STATEMENT
West Launceston Neighbourhood Watch	West Launceston	A community based crime prevention program aimed at minimising the incidence of preventable crime, especially burglary.
Mount Stuart Neighbourhood Watch	Mount Stuart, Hobart	As Above
Invermay East Neighbourhood Watch	Invermay East, Launceston	As Above
Southern District and Northern District Child Health Association	(Central South Branch in North Hobart) (Central North Branch in Launceston)	To promote the health and support the social needs of children and their families. To work in collaboration with Family and Child Health Services in providing education and support to parents. It supports the Child Health Centres and supplies equipment and libraries. The branches aim to provide informal support for members, promote health issues and have educative speakers. There are forty-three branches within Tasmania.
Lindisfarne-Rose Bay Progress Association	Lindisfarne, Hobart	To advocate and support all matters deemed by the association to be in the interest of the district.
Mount Stuart Progress Association	Mount Stuart, Hobart	As Above
National Council of Women (NCW) Association of Tasmania	(Central Branch located in Hobart)	NCW is affiliated with the National Council of Women of Australia consisting of nearly 500 affiliated organisations and with the International Council of Women (80 countries). The services the NCW in Tasmania aim to provide are: 1. Assisting community groups to support each other's work and work together on issues of mutual interest or concern. Provide opportunities for networking, building understanding and tolerance among the affiliates and the community; 2. Provide an information, networking and referral service for women and the community; and 3. Provide education services for the affiliated organisations and the public, via seminars, forums, brochures on health issues, newsletter, etc. The standing committee for Environment and Habitat in Tasmania were the group that volunteered to be involved in the case study.

3.3.3 Group recruitment procedures

During the month of February 1997, a search was conducted to locate appropriate groups for the case study. Purposive sampling was used in order to recruit the participating groups. This meant selecting the sample of observations believed to yield the most comprehensive understanding of the subject of study, based on the 'intuitive feel for the subject that comes from extended observation and reflection' (Babbie 1992:292).

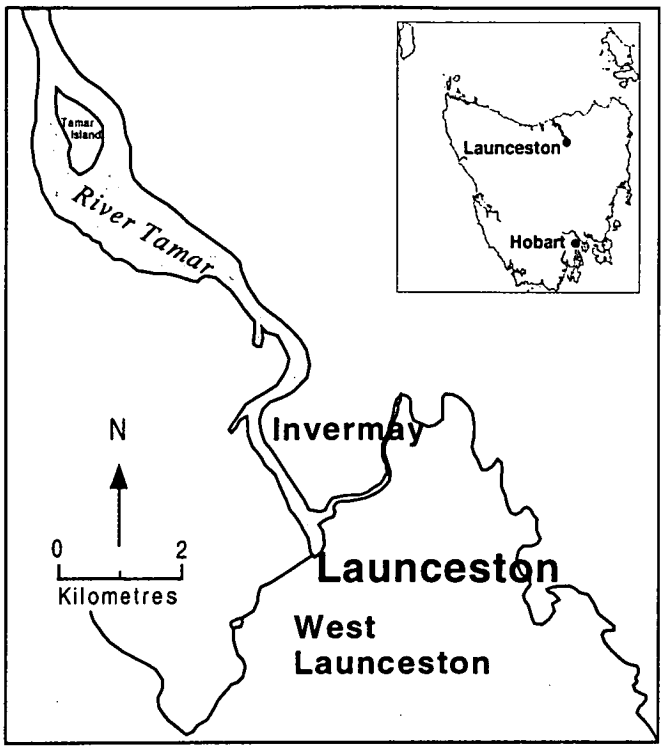


Figure 3-2 The location of the groups involved in the case study in Launceston.

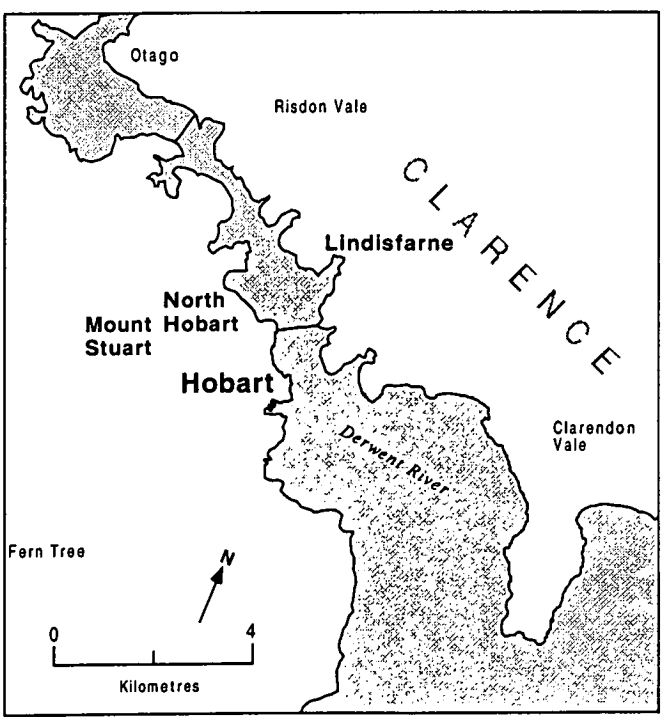


Figure 3-3 The location of the groups involved in the case study in Hobart.

The primary source for community group selection was through the Tasmanian Index of Community Organisations (TICO). TICO is a state wide computer-based index of more than 2000 community organisations and groups in Tasmania which is maintained by the State Library of Tasmania. It includes welfare, support groups, health services, arts and crafts groups, business organisations and government agencies. It provides current details about community organisations and their activities in Tasmania. Searches through this database, under the headings of health, progress groups, community groups, and neighbourhood watch presented approximately 150 possible groups for initial contact throughout Tasmania. Other sources for community group selection included the Launceston and Hobart Environment Centres, the telephone directory and publications of resource guides.

By determining the aims of a community group, their activities and role in the community, it was possible to compile a list of possible groups in both Northern and Southern regions. If the group aims were community oriented (i.e. for the betterment and interest of the local community), then they were considered possible candidates. Groups with environmental interest were avoided because the study was aiming to see if environmental issues, like the wood-smoke issue, could 'piggyback' on established neighbourhood groups with other principal interests.

Random selections of groups followed, alternating between the Northern and Southern lists in an attempt to have equal distribution of groups. An attempt was also made to have replicates of each type of community organisation in both the South and North. For example, if a progress group was recruited in the North, a random selection from the progress groups in the South was made. A random number chart was used to select the groups from the lists. Due to budget restrictions, the project aimed to involve between 6-8 community groups.

3.3.4 Group contact procedure

During March and April 1997, each selected group was approached by telephone to initiate contact. The researcher conducted all the telephone calls to minimise bias in response rates. A standard introduction was recited, explaining the purpose of the education program, the problem with wood-smoke and the importance of correct operation of woodheaters, the information kit, and some ideas of how the groups could be involved (see Appendix 1). A firm commitment was sought from the

groups as to whether they felt comfortable with the initial proposal and whether or not they wanted to be involved. A follow-up letter was sent out with further information and a request to attend a committee meeting at which the information kit would be presented (see Appendix 2).

Groups were rejected when: 1) the organisation's contact person felt the group would be uninterested and unwilling to participate in the program; or 2) a group failed to respond to messages left on their answering machine. This non-response was taken as the organisation being uninterested and unwilling to participate in the program. Using this process, eight groups were selected and twelve groups were rejected.

3.3.5 Working with and recording the activities of the neighbourhood groups

The following procedure was used when working with the neighbourhood groups. Firstly, the researcher and supervisor attended committee meetings of the eight groups and conducted a standard 20 minute talk to introduce the wood-smoke information kit and create enthusiasm for the project. The researcher emphasised a desire for the groups to take on the wood-smoke issue and the role of educators, and explained how the materials had been prepared for their use within the community. All possible options for the groups' involvement were discussed at the meeting. The groups involved in the project all tended to have either monthly or bimonthly committee meetings. Seven out of the eight groups conducted meetings during the month of June 1997 and one in early July 1997.

After the meetings, notes in a 'field diary' were taken to record observations of the groups. Records of the overall level of enthusiasm shown by the group were made as were the number of people present and the number who participated in discussion. The levels of enthusiasm and participation were subjectively scaled by the researcher on the basis of questions, discussions and proposed actions immediately following the presentation. Level of enthusiasm was scaled from one to five and referred to the overall level of interest, in both the topic and the education program, that a group displayed at the committee meeting. One referred to the group having a low level of enthusiasm and five was a very high level of enthusiasm. Level of participation referred to the number of people in the group that participated in discussions or asked questions at committee meetings. During that meeting a record of the

educational efforts the group planned was also recorded. Follow-up letters and phone calls were made throughout the winter and outcomes and impressions from these were recorded.

Additional observations were made during interactions with the neighbourhood groups in order to provide a basis for general comments about the different social processes in each group. These included the group's sense of community and the group leader's leadership qualities.

3.3.6 Assessing the social qualities and networks of the community groups

Research in the field of community psychology has examined the group processes that occur in voluntary community groups. An important aspect identified with respect to the effectiveness of community information programs is the concept of 'sense of community'. Research into 'sense of community' concentrates on group members' sense of belonging, their shared emotional connections, their mutual influence and fulfilment. In other words, the quality of the ties between the group members.

Researchers McMillan and Chavis (1986:8), developed a theoretical definition of sense of community. They state;

> "a community development process stimulates opportunities for membership, influence, mutual needs to be met, and shared emotional ties and support. The stronger the sense of community, the more influence the members feel they will have on their immediate environment".

Researchers suggest that a sense of community is a principle which contributes most to participation in voluntary community groups (Carr 1994:240). It has been found that sense of community is important for neighbourhood development, as it contributes to a sense of individual and group empowerment. When people are feeling a strong sense of community, they are motivated and empowered to take on and change problems they face in their community. Therefore, an indication of the sense of community experienced in the groups that participated in this case study was seen as an important variable in their likely success as disseminators of wood-

smoke information. This case study did not measure the variables that make up a sense of community. However, it recognised its general importance and qualitatively noted the group processes occurring amongst the community groups that participated in the project.

As a guide, the elements identified by McMillan and Chavis (1986:9) were considered during the qualitative process. The elements identified by the researcher include *membership* - the sense of belonging members feel in the group. This element means that the more people become involved and participate in a group, the more they feel a sense of belonging. The second element, *influence*, refers to a member's sense of making a difference to the group and the significance of the group to its members. It also encompasses the development of group norms and reference groups which affect and refine the attitudes and behaviour of the group's members. The third element is *reinforcement*, referring to the degree to which both individual and group needs are fulfilled. In other words, do the members in their group give each other reinforcement and support? It has been found that successful community groups are mutually enjoyable for everyone. Finally, the groups *shared emotional connections* are important. These include the history the group has shared, and similar experiences (McMillan and Chavis 1986:9). For about half of the groups in the case study, the initial committee meeting was the only time that the researcher had direct contact with the groups. Therefore, it was only deemed appropriate to draw inferences about sense of community in the groups that the researcher worked with most extensively.

3.3.6.1 Leader characteristics

Researchers have found that opinion leaders in groups have strong influences over other community group members. Participation in a community group does not necessarily ensure problems in the community will be addressed. In order for local action to be effective, researchers have demonstrated that having good leaders is important, such as those who are skilled at running and directing the groups (Chavis and Wandersman 1990:74; Hawe *et al.* 1990:76; DPIE 1992:58). A number of researchers have found that encouraging personal interactions between neighbours can increase conservation behaviour. They have reported that, by encouraging the development of 'block leaders' in a neighbourhood recycling program, participation

rates in local recycling can be significantly increased (Nielsen and Ellington 1983:306; Hopper and Nielsen 1991:217; Burn 1991:624). Therefore, in this study, a subjective and qualitative approach was taken to assess the qualities of the leaders of the neighbourhood groups that participated in the study.

Group leadership levels were scaled between one and five. One represented an apparent low level of leadership skills and five accounted for a high level of leadership skills. Leaders were assessed on their level of communication skills, whether or not they fostered a feeling of enthusiasm and encouraged exchange and sharing of ideas between the group members, and whether or not they ensured that all group members felt involved. They were also assessed on their levels of organisation: whether or not they were skilled at running and directing their group; whether or not they summarised throughout the meeting; and with consent, committed the group to certain activities in relation to the program. The degree to which the leader met these criteria affected where they were placed on a scale of one to five.

3.3.7 Assessing the educational actions of the community groups

In order to compare the educational efforts made by the groups, categories were developed based on the actions the groups initiated. The different levels of action in which neighbourhood groups participated were seen as continuous and cumulative and are defined as follows.

Level 1 involved basic participation by a neighbourhood group, for example publishing prepared material in the group's newsletter. At this level, the group was essentially participating in a minimal way and did not take on the issue as a group, but incorporated and distributed the information through their usual communication channel, the newsletter. Level 2 involved greater commitment to the program, such as organising and advertising a public meeting where the researcher presented information. At this level, the group made a team effort to actively support and take on the issue, the information was still used in a manner within the framework of the groups usual activities, but it required a significant effort and commitment to the program. Level 3 involved the group *initiating* new ideas and mechanisms outside their usual framework of information transfer to educate the community but without taking on the role of educators themselves.

At levels 1, 2, and 3 the groups were seen to progressively become more committed and more involved in the program. However, at these levels, it was considered that the group had not become active educators. Level 4 involved the group embracing the role of educators and initiating new ideas and strategies to educate the community. At Level 4, a group had reached a stage where the researcher considered the group to have taken on the issue as a group goal. From this position, the group were thinking of innovative ways to disseminate the wood-smoke information and were using their neighbourhood networks, and interpersonal channels to spread the message.

3.3.8 Evaluating feedback from the group leaders about the program

In order to obtain feedback on the program from the perspective of the neighbourhood groups, group leaders were interviewed. An interview guide was prepared which examined key areas including: service issues, participation, content issues, and interpersonal issues (see Appendix 3). The interviews were conducted by Associate Professor John Todd, the supervisor of the thesis. It was deemed inappropriate for the researcher to conduct the interviews because a social relationship had been formed between the researcher and the leaders, that may have, biased the evaluation. The responses were qualitatively assessed in order to determine important issues, which may have effected the program, that were identified by the groups. The results are discussed in Chapter 4.

3.4 WOOD-SMOKE INFORMATION KIT DEVELOPMENT

The information kit produced for the case study consisted of overheads for a seminar, an information booklet, and a pamphlet emphasising the steps involved in correct woodheater operation. Altogether, there was a substantial amount of information available for the community groups to use. It included background information about wood as a domestic energy source, air pollution and wood-smoke, health effects and wood-smoke, the processes of wood combustion, and clear steps that woodheater users can take to significantly reduce wood-smoke emissions. The objective of the kit was to provide the neighbourhood groups with useful and accessible materials on the topic and provide them with clear steps on how to use woodheaters correctly. It was hoped that providing the groups with information

would allow for an informed discussion to occur amongst the neighbourhood group members and, ultimately, within the general community.

Therefore, the aims of the wood-smoke education kit were:

- to provide the neighbourhood groups with materials that would give them an understanding of the wood-smoke problem and clear steps on how to operate woodheaters correctly in order to produce less smoke;

- to include a pamphlet with a comprehensive coverage of the topic and a guide to correct operation; and

- to provide a comprehensive booklet on the topic with overheads for a seminar. The seminar materials and pamphlet complemented each other in information and design.

3.4.1 Collecting appropriate information on how to develop an education kit

In order to develop an information kit suitable for use by neighbourhood groups, a review of general environmental education material available in the Tasmanian Environment Centre Inc. in Hobart, the Tasmanian Development Education Centre, State and University libraries, and the Australian Environmental Education Library was conducted. Both governmental and non-governmental material was reviewed. The environmental education material was generally in the form of booklets, pamphlets, posters and videos and a large proportion was written for distribution to, and use by, schools.

3.4.2 Collecting appropriate information on operation techniques

There is a growing body of information about minimising emissions from woodheaters, but it is spread across academic institutions (e.g. University of Tasmania, Virginia Polytechnic Institute and State University in the United States, University of Lund in Sweden, and Eindhoven Technical University in the Netherlands); woodheater testing laboratories (e.g. Amdel and Hermann Research Laboratories in Australia); and woodheater manufacturers (John Todd pers. comm.

March 1997). Over the last 15 years, the Centre for Environmental Studies at the University of Tasmania has had many research students examining the processes of combustion and emissions from woodheaters, largely under the supervision of Associate Professor John Todd. Therefore, much of the material on correct operation techniques has been refined over time, based on laboratory tests.

In order to receive expert advice from other academics and manufacturers overseas, a document stating the operation tips developed at the Centre for Environmental Studies and included in an information kit was posted on the e-mail site *stoves@crest.org*. Responses from manufacturers and scientists in Canada, United States and mainland Australia provided critical advice. Educational material from around Australia and overseas about the correct operation of woodheaters and the problems of wood-smoke were also examined in the development of materials for the information kit.

3.5 PAMPHLET DEVELOPMENT

The pamphlet's target audience was, principally, adults in the general community. The pamphlet was prepared with the expectation that adults would be receiving the pamphlet at a public meeting that they had chosen to attend. Consequently, the pamphlet was fairly large and contained a substantial amount of information. The pamphlet aimed to summarise all the main points made in the seminar and, thereby, reinforce the messages from the seminar. The pamphlet was a complete information document in itself, in case it was used in a different manner at a later date. As there were no specific plans for the pamphlet to be posted, there were no restrictions set on the size of the pamphlet. There were a number of aims that were defined during the development of the pamphlet:

1. The pamphlet should be designed to create interest and be attractive.

2. The information should be easily understood, and not be open to confusion.

3. It should inform the reader about: the domestic wood-smoke problem in their area; the potential health impacts; and provide clear information about the actions that can be taken to reduce

wood-smoke. For interested readers it should provide further detail on the processes of combustion and it should try to draw the topic into a context that may be familiar to people, for example, making reference to recycling and Landcare.

4. It should provide the reader with sufficient information presented in a convincing manner to encourage them to consider operating their heater correctly and stimulate discussion about the topic with others.

3.5.1 Design and artwork

Once the content of the pamphlet had been determined, the visual approach that the pamphlet would take needed to be refined. An effective message must be able to grab people's attention and maintain it. Researchers have shown that people will assign more attention to an image or message which is vivid and personalised (Zimbardo and Leippe 1991:137; Dennis *et al.* 1990:1115; Stern 1992:1227).

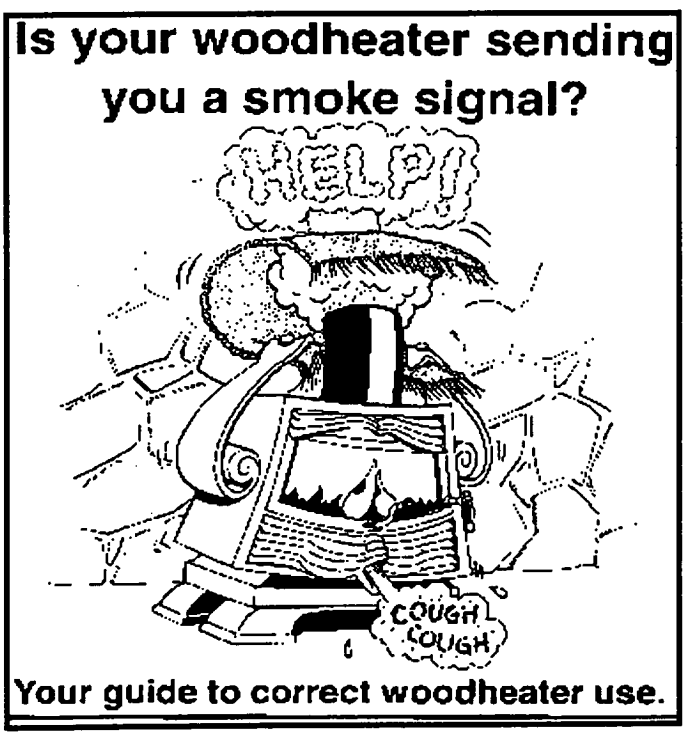


Figure 3-4 The front cover cartoon and title of the pamphlet and information booklet.

O'Loughlin (1988:121) found, through market research of a National Parks and Wildlife education campaign, that people responded best to a message that was

delivered in a 'fun' way rather than in a serious manner. For these reasons, the kit included 'fun' cartoons and some colour to make the material more vivid and salient. Figure 3.4 shows the front page cartoon and title of the pamphlet and booklet. It asks the serious question about whether a woodheater is producing a lot of smoke in a fun way. By saying "Your guide to correct woodheater use" it implies that the information contained personally belongs to the reader. Figures 3.5 and 3.6 illustrate some of the other graphics used in the pamphlet, and throughout the overheads for the seminar, to make the information more attention-grabbing.

It has also been found that a mix of educational material is very effective in achieving behavioural change (O'Loughlin 1988:vii). For that reason, the wood-smoke information kit consisted of the 'comic' pamphlet and a seminar booklet with overheads using the same cartoons. In the early development stage of the kit, a script for a ten-minute video was prepared, however, insufficient equipment and funds restricted its continued formation.

A graphic designer and cartoonist in Adelaide, South Australia was commissioned to prepare the drawings for the pamphlet. It was necessary for the author to design the layout of the pamphlet, including where all the text and drawings would be placed

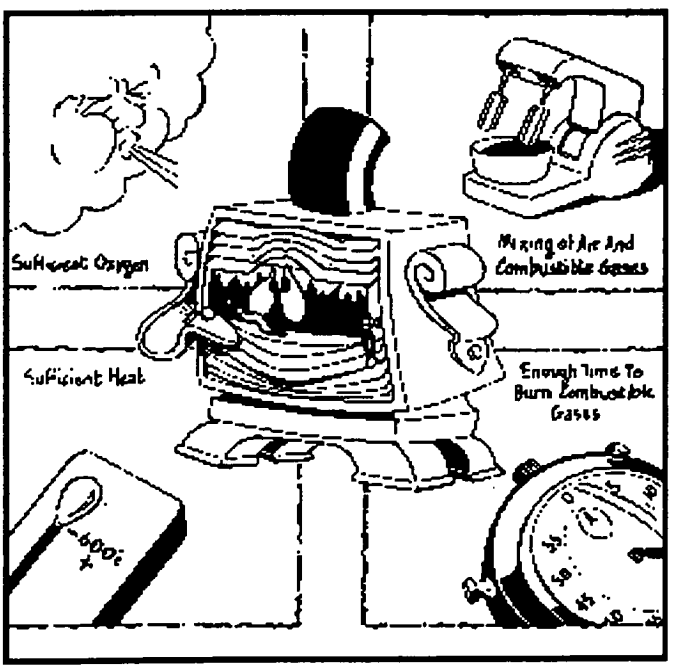


Figure 3-5 The graphics which accompanied text discussing the necessary conditions for wood combustion.

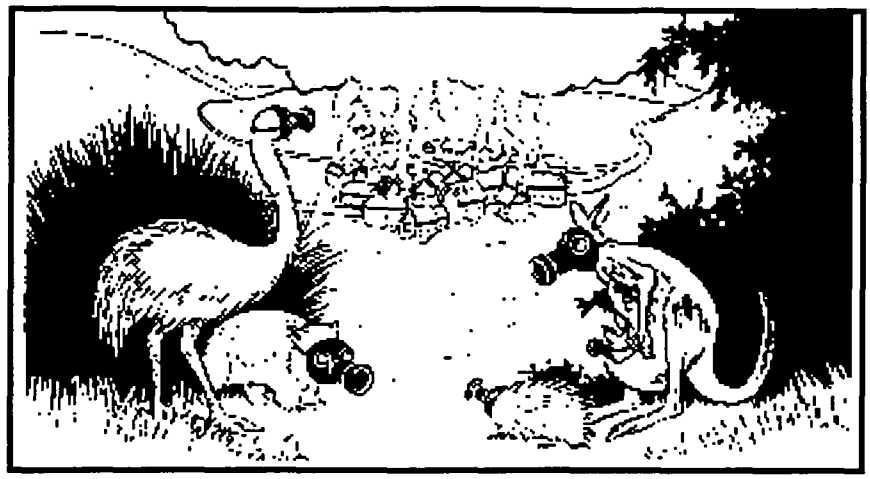


Figure 3-6 The graphics which accompanied text discussing the impact of wood-smoke on suburban air quality.

before passing it on for the inclusion of the drawings. It was also necessary to develop ideas and to prepare theme sketches for each cartoon from which the artist could work. The artist then faxed drafts of cartoons to the researcher and, with further communication, the appropriate cartoons were formed to the satisfaction of both parties. The final type-set pamphlet was delivered to a professional printer in Hobart (see Appendix 4). Two hundred and fifty copies of the pamphlet were printed and folded at a cost of $272.

3.5.2 Focus group assessment of pamphlet

An effort was made to pre-test the content of the pamphlet on a small focus group prior to the final production of the pamphlet. By pre-testing the pamphlet on a focus group, and making any necessary alterations, the chances of the information reaching the target group, and the likelihood of the readers being satisfied with the material, were greatly increased and, ultimately, the quality of the material would improve (Hawe *et al.* 1990:61).

At the time of pre-testing, the pamphlet's layout and content were determined, but the graphics were not yet developed. The aim of the focus group was to examine the content of the pamphlet and the general layout. The group were asked to look at the pamphlet and make comments on how easy it was to understand, if there was confusing language, anything offensive, and if they felt there was too much or to little on a topic and their general comments. A standard protocol questionnaire developed by the US Cancer Institute was used to develop these general questions

that the focus group members were asked to consider (see Section 3.7.1 for further discussion of the standard).

Six women and five men attended the group meeting. Eight out of the eleven had woodheaters as their primary heating source at home. Six out of the group had one or more children. Their professions were as follows: secretary working for the Hydro-Electric Commission, employee of outdoor ecotourism company, poet and teacher of English, oyster farmer, scientists, author of bushwalking guide to Tasmania.

Overall, the group were satisfied with the draft of the pamphlet and no major changes were suggested. However, one concern raised at the meeting was that there needed to be some comment on saving money when operating woodheaters correctly. A comment on the front page in relation to running cost and improved heater performance was included. Although cost is important it was not overly emphasised in this educational material. Operating woodheaters more efficiently can save the owner money, but there has not been any comprehensive cost analysis conducted and, for this reason, it was decided not to have it as a key consideration.

There was discussion with the focus group about how to best present information about wood-smoke and health risks. The pamphlet aimed to present some current information about the risks of wood-smoke to health without bringing in an element of fear. The words "exacerbate" and "aggravate" in discussing health effects were chosen to convey the serious effects without causing too much concern. There was also a suggestion about urging people not to burn rubbish in their fires but, due to space restriction, it was decided to not include that information in the pamphlet. The comments made by those at the focus meeting were incorporated into the pamphlet where they were deemed appropriate. Through this process, the pamphlet was refined prior to the final production phase of development.

3.5.3 Readability of the pamphlet

As well as pre-testing a typical audience's reaction to the pamphlet through the focus group, a test was run to evaluate the ease of comprehension. A procedure called the SMOG formula was used on the pamphlet to estimate the difficulty of the writing (Hawe *et al.* 1990:70). The formula is based on research that suggests that texts

with lots of polysyllabic words require greater levels of comprehension to understand.

By applying the SMOG formula, it is possible to establish a reading age for the text based on the number of polysyllabic words used. The pamphlet recorded a SMOG reading age level of 12 years old. In comparison, to help with interpretation, *The Australian* newspaper has a SMOG level of age 15, and the New Idea magazine has a SMOG level of 11 years old. According to Hawe and her colleagues (1990:71) who wrote "Evaluating Health Promotion", if a message is pitched at a wide audience, the SMOG level should be a maximum of 11 or 12. Therefore, the pamphlet for the case study fell within these advised limits. Given that the audience was predominantly adults, it was deemed suitable. A schematic representation of the processes involved in preparing the pamphlet are summarised in Figure 3.7.

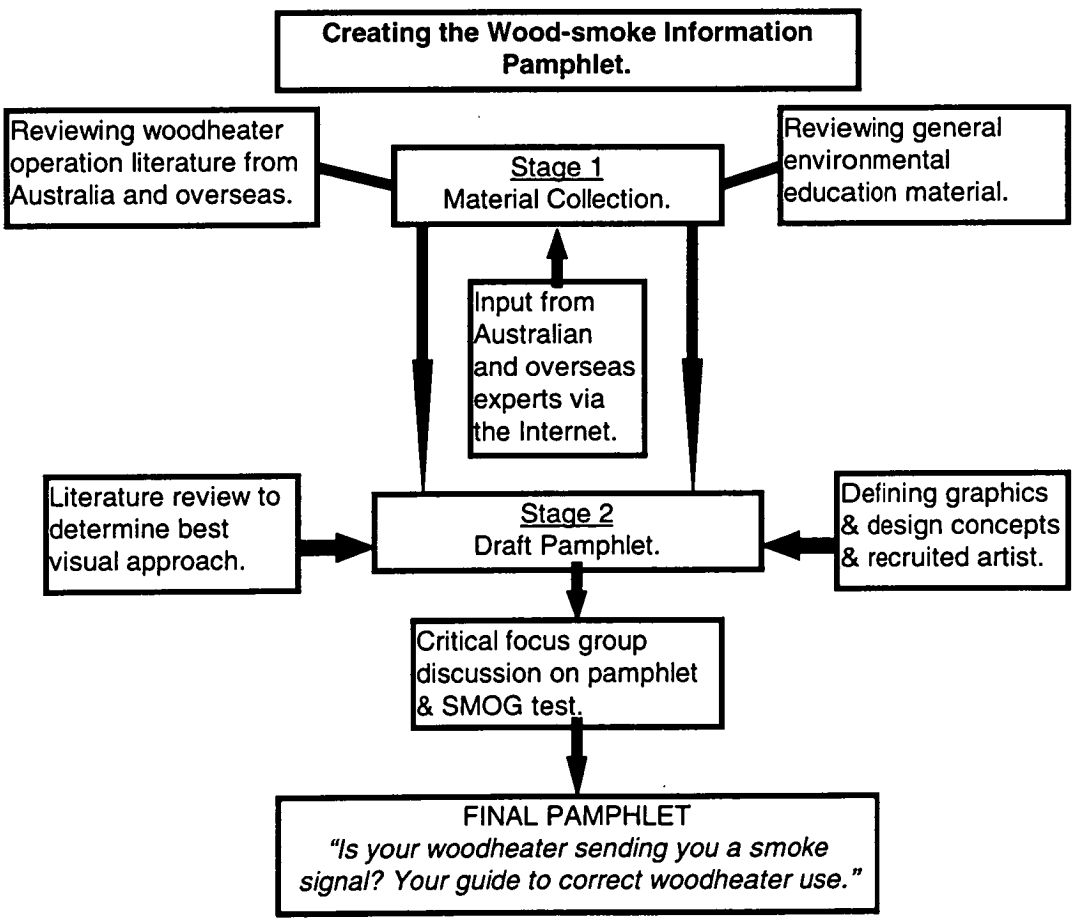


Figure 3-7 The necessary steps taken in the development of the pamphlet.

3.6 SEMINAR BOOKLET AND OVERHEADS

The seminar booklet and accompanying overheads were written for use by the neighbourhood groups. They were prepared with the intention that the neighbourhood group members themselves would use the materials and present the seminar material at meetings. It was decided that only one medium of visual display should be used. As overheads were inexpensive, simple to use and more adaptable (for example, sections can easily be blocked out), they were chosen in preference to slides.

The ring bound booklet was twenty three pages. In the introductory section of the booklet, it was suggested that the presentation could be as long as the presenter wished as sections could be omitted. The entire presentation took approximately 50 minutes and a shorter 30 minute presentation was suggested with the appropriate accompanying overheads. In this way, it was possible that groups could use the presentation in an hour-long seminar, split it over two sessions or use the shorter version of 30 minutes. The booklet was written in such a way that the presenter could simply read out the text, with each change of overhead prompted in the text. The following aims were set for the production of the seminar materials, several of which were the same as for the pamphlet:

1. They should be designed to create interest and be attractive;

2. The information should be easily understood, not open to confusion;

3. The material should contain information for the seminar about the following topics: wood as a domestic energy source; wood-smoke and air pollution; wood-smoke problem areas in Australia; wood-smoke and health risks; the processes of combustion; and clear steps on how to operate woodheaters correctly in order to reduce wood-smoke production;

4. The material should be presented in a manner that makes it easy for someone unfamiliar with the topic to understand and feel confident in using it to give a presentation;

5. It should provide the presenter with sufficient information to feel informed about the topic and to be able to make a judgement about how much of the presentation material they would like to present; and

6. It should be written in a manner that is easy to read and show continuity with the accompanying overheads.

3.6.1 Final presentation

Once the pamphlet, seminar booklet and overheads had been finalised and printed they were presented in a clear plastic folder. Each of the eight wood-smoke information kits contained a booklet and 23 accompanying overheads in addition to 30 pamphlets (see Appendix 5 for examples of overheads and text from the booklet). These kits were described and given to each of the groups during the initial committee meetings attended by the researcher.

3.7 EVALUATION OF INFORMATION KIT

This section discusses the methods used to evaluate the effectiveness of the information kit. As stated in Chapter 2, this case study did not attempt to evaluate the behavioural changes in people who were exposed to the educational material as that would require a longitudinal style study. However, an attempt was made to evaluate the predicted effectiveness of the pamphlet, by getting experts to evaluate its content and general presentation. The seminar material was evaluated by responses to the surveys distributed at the public meetings organised by the neighbourhood groups.

3.7.1 Evaluating the pamphlet

Nine experts in Australia involved in producing educational materials were asked to participate in filling out a pamphlet assessment questionnaire. Individuals from the following government agencies: New South Wales EPA; South Australian EPA; Environment ACT; Victorian EPA; Department of Environment QLD; Department of Environmental Protection WA; Environment Australia; the Environment Centre in Hobart; and the Energy Information Centre in Adelaide were telephoned and asked if they would complete a questionnaire on the pamphlet. The questionnaire

and pamphlet were sent out to the experts at the beginning of October and they were requested to respond by November 1997.

A standard protocol has been developed for assessing the presentation style and content of leaflets. It was developed by the US National Cancer Institute for feedback on leaflets and audiovisual material before they are distributed in their final form (Hawe *et al.* 1990:70). This standard was used to prepare questions for the focus group and was used for the development of the questionnaire distributed to experts. The questions asked of the experts are shown in Table 3.2.

The aim of this process was to gain feedback on the pamphlet content and presentation. Although the pamphlet would not be developed any further, as it would be in its final state for distribution, it was thought the feedback could influence further wood-smoke educational material that might be developed. Also, if the experts reported that the pamphlet was of good quality, it would allow a more accurate assessment of the quality of the educational material prepared for the neighbourhood groups.

Table 3.2 Pamphlet assessment questionnaire prepared for experts.

Pamphlet Assessment
• Attraction: Does the pamphlet create interest? Will it attract people's attention? What do you like most and least about it?
• Comprehension: Is the pamphlet easy to understand? Is there anything confusing in the pamphlet?
• Acceptability: Is there anything offensive or irritating in the pamphlet?
• Personal Involvement: Does the pamphlet seem to be directed at the reader personally?
• Persuasion: Is the pamphlet convincing? Does it seem to persuade the reader to do something?
Comments:

3.8 MEETING SURVEYS TO ASSESS SEMINAR MATERIALS

In order to assess the quality of the seminar material, a post-seminar survey was provided at public meetings organised by the voluntary neighbourhood groups. As this study was conducted over a short period of time, an attempt to determine the effect of the seminar on an individual's attitude or behaviour would not be

appropriate. This process of surveying attendants at the meetings should be seen as a measure of the quality and reception of the material and may provide an indication of the likely effect of the information on the receivers. However, it is not conclusive. If the study were more long-term, it would be possible to take the feedback from the surveys and use it to determine whether or not the program was reaching its target group successfully and also for refining and improving the program.

3.8.1 Survey structure

Self-completed questionnaires were used to collect data about the seminar materials. The questionnaires were distributed after the seminar and the audience spent a few minutes filling out the questions before they left. Using this process of asking people to fill out the questionnaire at the meeting led to a high return rate. In fact, in all cases, all the audience filled out the questionnaires.

A variety of question designs were employed in the survey, including matrix question format, contingency questions, and skip questions. The questions were constructed so that they would be exhaustive and mutually exclusive. Exhaustive means that they included all possible responses. To ensure this, where necessary, an "Other" option was supplied. Mutually exclusive means the respondent should not feel compelled to select more than one answer (Babbie 1992:148). The meeting survey and the telephone survey have a number of identical questions. Sections 1, 2, and the final demographic questions are the same. For a discussion on the development of the questions in these sections refer to Section 3.9.2.2 (Survey structure).

Section 3 of the seminar questionnaire was devoted to the presentation and seminar materials. The first two questions asked were about how much the respondents enjoyed the seminar and whether or not they found it interesting and relevant to them. To influence change in an attitude or behaviour it is necessary, firstly, that the message be understood and that the information is scrutinised by the recipient, and secondly that it is integrated with their existing beliefs (Petty *et al.* 1992:94). Many studies have documented the importance of comprehension (Zimbardo and Leippe 1991:148). It is also very important that people feel the message is personally relevant to them. Messages that are personally important or relevant are more likely to be thought about than less personal and seemingly less important messages

(Zimbardo and Leippe 1991:148). The personal relevance of a message affects a person's general motivation to comprehend and process a message and, therefore, is one way of increasing thought on the subject (Petty *et al.* 1992:82). If there is a desired attitude change as a result of that message, it is likely to be stronger and translate into consistent behaviour if people initially find the message relevant. Zimbardo and Leippe (1991) write 'the wise message maker emphasises the personal implications of the message at hand'. Therefore, the questionnaire attempted to record the levels of enjoyment, interest and self-reported relevance of the information in order to assess the likely influence the messages in the seminar would have.

Question 3.4 enquired about the respondent's previous knowledge on the topic. Research has shown that the more knowledge a person has on a topic, the less likely they are to be persuaded and the more likely they are to show greater resistance to a message (Zimbardo and Leippe 1991:148). This finding is not really surprising, and neither is the finding by researchers that we have a tendency to pay closer attention to messages that support our beliefs or attitudes. Interestingly, a message that advocates a position consistent with a person's previous knowledge, but more extreme, is likely to influence the receiver of the message. By asking this question in the survey it gives some idea of the general knowledge base of the respondents on the topic.

In order to encourage the people at the seminar to change their woodheater operation techniques, it would be necessary to teach them some new actions or operating skill. Researchers have found that, in order to produce any behavioural changes, it is not only important that individuals have the new skill but that they also have the confidence to implement the new actions (Petty *et al.* 1992:94). Therefore, question 3.5 and 3.6 of the questionnaire asked the respondents if they had learnt any new skills and, if they had, would they feel confident using them. By having this information, it again provides a clearer idea about whether or not the seminar information is likely to produce behavioural changes in the respondents.

Therefore, the questions asked in the survey covered general information on heating types and perception of the wood-smoke problem, but also tried to assess the

effectiveness of the seminar in providing the foundations for good message delivery (see Appendix 6 for survey).

3.8.2 Analysis of survey data

The survey results were entered into the social statistical package, SPSS, and frequencies and chi square analyses were conducted on the data. The results are discussed in Chapter 6.

3.9 TELEPHONE SURVEY FOR NEWSLETTER INFORMATION IMPACT

Newsletters produced by neighbourhood groups, community groups and local councils are a means of spreading information to the local community. All of the neighbourhood groups involved in the case study produced their own newsletters. It was predicted that the groups would choose this as a popular means of passing on the information about wood-smoke. Therefore, an effort was made to evaluate the effectiveness of this means of disseminating information.

During the course of the program, many of the groups distributed the wood-smoke information through their local newsletters. One of the groups, the Lindisfarne-Rose Bay Progress Association, suggested during our initial meeting that an article be placed in their local city council newsletter. This was proposed because of its wide circulation to some 21 000 households. It was decided that this would be the appropriate newsletter article around which to conduct a survey because of the ease of sampling. As it was a council newsletter, it would be distributed to many suburbs and, through identifying these areas, a random selection of households could easily be made.

The Lindisfarne-Rose Bay Progress Association supported a deputation to meet with the Mayor of Clarence and discuss having an article included in the publication. The leader of the neighbourhood group wanted to attend the meeting but ultimately was unable due to sickness. The meeting was successful and resulted in the September edition of the "Clarence City Council News" containing an article entitled 'Is your woodheater sending you a smoke signal?' (see Appendix 7). The article included general discussion about the problem with wood-smoke, a number

of tips on correct operation and how to obtain a pamphlet which was available from the council offices.

It was assumed that, in most ways, the effect of the Clarence newsletter article on its readers would be similar to other publications produced by neighbourhood groups, such as Neighbourhood Watch and Progress Associations. It was hypothesised that the readers of the Clarence newsletter may pay more attention because it is a local government publication. Given the benefits of using the Clarence newsletter, in terms of good sampling techniques that could be employed for the telephone survey, it was decided that any indeterminable effects would have to be over-looked and the results of the telephone survey could, to a large degree, be extrapolated to predict how people responded to the article in other publications. The aims of the telephone survey were as follows:

1. to determine whether the population who read the article could recall any useful information about the topic or operating techniques from the article;
2. to gain some idea of how people are currently using their woodheaters;
3. to gain insight into the population's current perception of air pollution and the importance of wood-smoke for comparison with previously conducted surveys;
4. to gain insight into what the population think would be the most effective way of distributing information about the problem; and
5. to determine which means of dissemination the population thought was most likely to effect and change their behaviour.

3.9.1 Subjects

Clarence municipality is located on the eastern shore of the Derwent River in Hobart (see Figure 3.3 for general location). At the time of the survey, it consisted of fourteen suburbs. Due to the large distribution of suburbs, there is a broad spread of socio-economic status throughout the council area. There are three significant clusters in the areas of Risdon Vale, Rokeby and Clarendon Vale, and some pockets

of Lindisfarne which have higher percentages of government owned rented dwellings which experience higher levels of unemployment and relatively low incomes. In areas such as Otago, Howrah and Tranmere there are concentrated areas of high income families ($50 000 or more). In many of the older Clarence suburbs, such as Bellerive, Howrah, Lindisfarne, and Rose Bay, there are high percentages of home ownership. There are also relatively high percentages of houses being purchased throughout Otago, Risdon Vale, Rokeby, Howrah. Rates of privately owned dwellings being rented are generally low through out the Clarence district (ABS 1991). These statistics indicate that there is a spread of different socio-economic status throughout the region and that there are reasonably high levels of home ownership and people who are currently buying homes. This would affect the number and distribution of people that would be receiving the Clarence newsletter with their rate notices.

3.9.2 Procedures

The 'Clarence City Council News' newsletter was dispatched between Wednesday the 3rd and Friday the 5th of September, 1997 to the residents in the Clarence municipality. The telephone survey was carried out between 8th of September and the 26th of September, 1997. The telephone calls were made by three interviewers during the evenings between 6 and 9 PM and all the calls were made from Hobart. One hundred households were interviewed in the survey. If the person who answered the phone was over 16 years, then they were asked if they would participate in the survey. Approximately 30 percent of those called refused to participate in the survey. The cost of the survey, including call charges and payment of the two interviewers was approximately $150.

3.9.2.1 Sampling method

Telephone numbers were selected at random from the 1997 telephone directory. The area codes of all the regions in the municipality of Clarence were obtained from the council. From the telephone directory, the telephone prefixes applicable to these area codes were recorded. By using a random number table, one hundred pages were selected followed by a random selection of one of the four columns on each page. Finally, random numbers were used again to select a position of a telephone number

in a column. If the number selected was a business or government premise or did not have the correct prefix, then the closest number preceding it which was appropriate was chosen. If an entire column had no private numbers listed, then a new page was selected using the next random number. If there was no answer on the telephone number selected, or there was a refusal to participate in the survey, then the preceding suitable number was selected from that page and column. If three numbers failed to answer from one page, a new page was selected.

3.9.2.2 Survey structure

As in the seminar questionnaire, a variety of question designs were employed which were written in a manner that was exhaustive and mutually exclusive. The survey was made up of four sections (see Appendix 8). Firstly, a background information section which asked respondents about the type of heating used in their household. This information would be useful for comparison with older surveys to identify the distribution of heating type in the area.

The next section had questions related to the respondent's perception of wood-smoke pollution and asked about air quality and causes of air pollution. It also enquired about the role respondents thought they could play in reducing wood-smoke levels. These questions were used to gain insight into the current perception of the wood-smoke problem and the level of responsibility people feel regarding air quality.

A matrix designed question was then asked to examine the degree to which people supported a range of hypothetical actions to control wood-smoke such as: greater local government controls; banning woodheaters; and expanded community campaigns. There are some inherent dangers using this format of questioning. This type of question uses statements and gives people a scale of options as to whether they strongly agree through to strongly disagree. As respondents can quickly check their earlier responses, they may choose between, for example, 'strongly agree' or 'agree' based on their previous response. People can also get into a pattern of responding called a 'response set', for example, marking 'mildly agree' to all the statements (Babbie 1992:156). Regardless of these problems, it is an excellent way to ask a question which has a number of answer categories to address. It saves space and makes it easier for the respondents to fill out.

Sections 3 and 4 of the survey were answered only by woodheater owners. The questions in Section 3 were specifically concerned with the wood-smoke article in the city council newsletter, while Section 4 asked questions about current operation techniques used by the householder. The reason only woodheater owners were asked questions in section 3 was that the researcher suspected that woodheater owners were more likely than non-woodheater owners to notice and read the wood-smoke educational material. By only asking woodheater owners, the researcher thought a trend in the readership and effects of the article could be identified and it would minimise the number of questions asked of non-woodheater respondents in the survey. Two of the questions in Section 3 asked woodheater owners about any educational material they had seen in the past and a matrix design question asked them to identify the most effective means of communication that could be used to reach them with woodheater operation information.

Section 4 was devoted to determining the current user practices of the woodheater owners. A number of the questions in this section were drawn directly from past questionnaires (Todd and Brett 1992:12). These questions asked about how often people checked the amount of smoke their heater was producing, and whether or not they run it for 15-20 minutes with full air supply after refuelling and in preparation for overnight burning. As these questions were written in a leading manner, the researcher was aware that they were susceptible to what is called 'social desirability' responses. In such cases, the respondent can sense the answer that the researcher wants to hear and they may answer in that manner regardless of their true response. Despite these problems with the question design, these questions were used to enable comparison with other surveys. To conclude, Section 4 included two open-ended questions. One was related to the householder's satisfaction with heating sources and future heating plans. The other stated one of the primary purposes of the questionnaire, i.e. how to get correct operational information to households and asked for any general comments.

The final section of the questionnaire was devoted to demographic questions. These were kept to a minimum to avoid refusals or getting complaints. Respondents were asked to categorise their age and their gender was marked down by the interviewer.

Therefore, the survey attempted to gain an understanding of the current perceptions of the wood-smoke problem in Clarence. It hoped also to gain an appreciation of how respondents felt about different hypothetical actions to control wood-smoke, and how they thought educators could best reach the community with correct woodheater operation techniques. Finally, it aimed to attain an idea of the current operation techniques used by woodheater owners in the sample and compare those with past surveys to ascertain whether or not there had been any significant changes in operational behaviour over the last few years.

3.9.3 Analysis of survey data

The Clarence telephone survey results were entered into the social statistical package, SPSS, and frequencies and chi square analyses were conducted on the data. The results are discussed in Chapter 5.

3.10 SUMMARY

This chapter has described the methods used to develop and evaluate the data collected for this case study. Chapters 4 to 6 describe the results of the case study. Chapter 4 includes a discussion about the participation of the voluntary neighbourhood groups in the education program from the perspective of the researcher and feedback on the program and their role from the neighbourhood groups' representative. Chapter 5 contains the results of the telephone survey of the Clarence municipality seeking public opinion on wood-smoke as a source of nuisance and pollution, public acceptance of possible control measures, the role of education, the role of newsletter articles in education and current woodheater owners' operation techniques. Chapter 6 presents the results of the information kit evaluation. This includes experts' opinions on the pamphlet and survey responses on the seminar materials from people attending public meetings.

4 NEIGHBOURHOOD GROUP INVOLVEMENT IN THE EDUCATION PROGRAM : RESULTS AND DISCUSSION

The qualitative methods used to collect and evaluate the actions and the responses of the groups to the education program are discussed in Chapter 3. The research findings presented in this chapter include records of the community group's educational efforts, initial responses to the education program and the social qualities of the group. Finally, this chapter presents the comments of leaders of the neighbourhood groups on the education program and their involvement.

4.1 RESULTS AND DISCUSSION OF THE EDUCATIONAL EFFORTS OF THE NEIGHBOURHOOD GROUPS

Table 4.1 summarises the results of the qualitative assessment, presented in Chapter 3, of the overall actions of the participating groups, their levels of enthusiasm, participation levels and leadership skills at the committee meetings. The assessment procedure was a subjective one and some justification for the methods used to carry out this process was discussed in Chapter 3. All of the groups attained a 'level one' response by including information in their community newsletters. This usually meant that the groups published an article prepared by the researcher in their local newsletter or correspondence. The articles were approximately 100 words with some graphics from the pamphlet. They provided a brief introduction to the wood-smoke problem and selected operational tips (see Appendix 9 for some examples). Each newsletter had a circulation of between 50-1000 households. For five out of the eight groups this was the final level of development reached in the program.

A pattern emerges when leadership qualities and enthusiasm levels initially shown by these five groups at the committee meeting are assessed. All of the five groups (except for the Child Health Association B group) recorded enthusiasm levels of between two and three. In terms of the group leader's qualities, all the group leaders ranked between two and three. As little time was spent with these five groups, apart from the initial committee meetings, it was not possible to draw conclusions about these groups' sense of community. However, several groups commented on their struggle to increase membership in the face of a general lack of motivation and attendance by the wider community to their group meetings. Therefore, these types

of comments suggest that the sense of community within the groups was probably low.

Table 4-1 Responses of the neighbourhood groups to the education program at the committee meetings, their leadership and the level of action each group attained.

Group Name	Attendants	Level of Enthusiasm 1 is low/ 5 is high	Level of Participation 1 is low/ 5 is high	Level of Action 1, 2, 3, 4	Level of Leadership 1 is low/ 5 is high
Neighbourhood Watch Group A	7	4	5	1	3
Child Health Association A.	12	5	5	1-2	5
Community Group A	17	2	2	1	2
Progress Association A	6	5	5	1-2-3	5
Progress Association B	6	3	5	1	2
Child Health Association B	20	4	4	1	3
Neighbourhood Watch Group B	9	3	3	1	3
Neighbourhood Watch Group C	11	5	5	1-2-3-4	5

LEGEND

Levels of Action	**Level of enthusiasm and participation** (1 is low and 5 is high)	**Level of Leadership** (1 is low and 5 is high)
Level 1 = Basic Participation, ie newsletter Level 2 = showed commitment to be active in program i.e. organise a public meeting Level 3 = initiated new ideas but not educators Level 4 = initiated new ideas and took on role of educators.	Level of enthusiasm referred to the overall level of interest that a group displayed at the committee meeting. Level of participation referred to the number of people in the group that participated in discussions and questions at committee meetings.	Leaders were assessed on interpersonal communication skills and organisational skills (see Chapter 3).

Although the neighbourhood groups were contacted in March and April to participate in the program, the committee meetings when members were introduced to the topic and materials did not occur until June and July 1997. As it was already winter, the groups were required to become actively involved in the program almost immediately. This did not give the groups very much time to become comfortable with the program, the new information, and the role they could play in any educational efforts. Also, given that the groups all had other principal interests, were volunteers and generally did not have high membership levels, it was not deemed surprising that they were unable to devote more time and effort to the project. It was

still seen as an important step that these groups responded favourably to the idea and were willing to 'take on board' an environmental issue outside their primary group purpose.

Three of the remaining groups progressed to level two, where they initiated and organised public community meetings and arranged for the researcher to come and present the information seminar. Promotion of these meetings varied. For example, Progress Association A, arranged for a community announcement to occur on ABC radio, fliers were letterbox dropped to 500 homes, and notices were put up in shopping centres. Other groups advertised meetings in their newsletters and through notices pinned-up in the region.

Progress Association A advertised the seminar as a draw-card to their annual general meeting. Unfortunately, the numbers at the meeting were so small, with only one new person in addition to the existing committee members, that it was deemed inappropriate to present the talk and a summarised version was given. This, in itself, is an interesting finding. Given the considerable effort that the group members made to advertise the seminar, the researcher had expected at least some interest from the wider community.

Perhaps this finding illustrates a number of the barriers to educating the community about this particular problem. Public concern with environmental issues, such as wood-smoke, is often very much a matter of "out of sight out of mind". People also have difficultly attributing personal behaviour to the problem. People feel uncomfortable and nervous about an environmental problem that is publicly visible but often when the problem disappears so does our concern. As the effects of many environmental problems are not highly visible, they tend to have relatively low salience (Zimbardo and Leippe 1991:333). The wood-smoke problem, because it is influenced by the users of woodheaters, geography, and weather patterns, is seasonal and problems are often regionally located, can result in a low salience to the wider community and high saliency to particular groups.

In addition to this barrier of low salience, is low motivation. As noted by Burn (1991:617), many people do not feel obliged to act in a particular way when others in the community are not, thereby reducing their sense of personal responsibility. This factor could have a major impact on the wood-smoke problem because it only

takes a few people in a suburb to use their woodheaters incorrectly to produce considerable air pollution. This would leave the rest of the neighbourhood uninspired to correctly operate their heater in order to reduce smoke. In addition, our pro-environmental motives have to compete with stronger needs and desires, such as the convenience of just throwing a few logs in the fire and turning the air down so that the wood will 'last' longer (Zimbardo and Leippe 1991:333; Burn 1991:617). As discussed in Section 2.5.2.2, because the wood-smoke message is a *preventative* one, people do not see it as urgent or as a problem that affects them directly thus needing their immediate attention.

Therefore, the advertised meeting was targeting a small proportion of people who were affected directly by the wood-smoke problem and were motivated enough to come to a meeting to learn how to improve the situation. The low attendance of the general public at the meetings may also suggest something about the attitudes people have towards community groups such as Progress Associations. Many may have felt intimidated about going to the Annual General Meeting as they may have been unaware that non-members are welcome, or uncertain about attending a formal meeting.

Child Health Association A was another group which moved on to 'level two' by way of a branch meeting of eight women in an inner Hobart region. The group were from the local neighbourhood area and had been friends and members for many years. This meeting was advertised in newsletters. Any Child Health Association members in that branch's region had been invited to attend. The researcher presented the seminar on the topic of wood-smoke, and those attending responded with interest and took the information pamphlets to distribute at the local Child Health Centre. The Neighbourhood Watch Group C also advertised the seminar presentation in their local newsletter. Fourteen people attended the meeting at the local school. Several were members of the committee but the remainder were 'branch leaders' and members of the general public. Again, the meeting was followed by a general discussion on the topic and distribution of the pamphlet.

Two of the groups, Progress Association Group A and Neighbourhood Watch Group C became further involved in the education program. Progress Association Group A initiated a new way of using the wood-smoke information. Two committee members

of the neighbourhood group were aldermen on their local council. These existing connections directly influenced how the group approached the task of disseminating the wood-smoke information. The group suggested a deputation be made to see the Mayor of Clarence, to propose including the wood-smoke education information in the council newsletter. The President of the Association wanted to attend the meeting with the Mayor but ultimately was unable to do so. At the meeting, the researcher made a request to include an article with woodheater operation tips and wood-smoke information in the City Council's newsletter. Normally, the contents of the newsletter are council related and initiated. However, because the idea to include the information was from the Progress Association and the University of Tasmania, and, it was information applicable to the municipality, the Mayor agreed to include the article. A column of the September 1997 issue of the Clarence City Council News was devoted to the wood-smoke issue and it was delivered with rate notices to around 21 000 households. The article was prepared by the researcher and is shown in Appendix 7. Due to space and layout restrictions, the council chose not to include graphics. The article appeared in a Special Edition of the Clarence City Council News which was entitled Merger News. The proposed merger of the Clarence City Council into the Hobart City Council has been and continues to be (at time of writing) a controversial topic. The way in which this may have effected readership and response to the article is discussed in Chapter 5.

Progress Association A demonstrated initiative in terms of developing ways to increase the dissemination of the wood-smoke information. This showed that the group had made a significant commitment to the cause and had adopted the issue into their agenda. A member of Progress Association A, who is employed by the local fire brigade, offered to take pamphlets to his workplace and plans to distribute them when the brigade attends chimney fires. The fire brigade normally explain to the home owner about correct operation of woodheaters and decreasing creosote build up in the flue, and in future plans to leave the pamphlet as well. Finally, the group have made a formal commitment as an Association to continue lobbying the council for greater education efforts about the wood-smoke problem. The council are currently updating their list of municipal voluntary community groups and the Progress Association would like the council to give information to all these groups and continue to educate the community via these groups. They are also planning to

use the information kit provided to them through the case study in preparation for the winter of 1998 and plan to conduct another public meeting earlier in the year. These plans by the group are verging on 'level four' activities, however, because these activities have not occurred to date, for the purpose of evaluation of the case study, the group were regarded as reaching 'level three'.

Neighbourhood Watch Group C progressed to level four by showing a degree of independent and innovative use of the materials and by taking on the role of educators. This group initiated a door knocking program, targeting smoky chimneys in the neighbourhood. In their local newsletter, they announced that the group was cooperating on a university project and advised woodheater owners that a member may visit them, first with some useful material on woodheaters and then a week later to see what effect the information had on the way they used their heaters. The group also conducted a 5 point quiz called "You and Your Woodheater". Due to the low number of responses to date it is only possible to qualitatively review the results of this effort. Six, out of ten, respondents who completed the self-administered quiz had owned and operated a woodheater for between 10 and 20 years. Of these, when asked what percentage of the information pamphlet did they already know, the average response was 65 percent. Four out of ten respondents had owned a woodheater for between 3 and 8 years, and the average response was that they knew 70 percent of the information previously. The quiz also asked what practices they had changed since reading the pamphlet in the past week. Some samples of the comments people noted were: "run the heater on high burn for 25 minutes after filling the fire with wood"; "putting paper on top as well as underneath"; and "keeping the air supply into heater". The final question asked what things people would do in the future as a result of reading the information. Some of the responses were: "check the flue outside for smoke"; "check the flue for accumulated creosote"; "build a shelter for wood"; and "put heater on high for half and hour before shutting down for the night".

This type of innovative action by the neighbourhood group was the sort of response that the researcher had hoped would occur. In this situation, the Neighbourhood Watch members who conducted the door knocking campaign were acting as opinion leaders and educators themselves. Using a technique such as this, which is similar to the role of 'block leaders' in recycling, may be affective for a number of reasons

(see Section 2.5.3.3). Firstly, it is capitalising on the benefits of interpersonal communication from a homophilous source (assuming that neighbours have somewhat similar socio-economic status). Secondly, these 'leaders' are sending the message that 'other people' are concerned about the problem and are trying to use their woodheaters more efficiently. This, presumably, may lead to increased efforts by the householders because they will have a desire for social approval. Thirdly, personal contact is likely to result in a verbal commitment from the individual to read the pamphlet and perhaps change their practices, especially when they know the 'leader' will be returning to collect the completed quiz.

4.2 EFFECTS OF SOCIAL QUALITIES IN COMMUNITY GROUPS

The three groups that did manage to participate more fully than others, and in more innovative ways, had a number of factors in common. Firstly, all three had level five leadership (see Table 4.1). The neighbourhood group leaders showed very high levels of interpersonal skills in communicating with the group members. They created a sense of enthusiasm about the program that inspired the other members, they encouraged the exchange of ideas between the group members and were skilled at running and organising the group. They all summarised at the end of the meeting the goals and the commitment that the group had made to the program. These groups also rated level five on levels of enthusiasm and participation in the initial committee meeting. As the researcher worked more extensively with these groups, it was possible to draw some conclusions about these groups' sense of community.

In Child Health Association A, the researcher decided there was a reasonably high level of sense of community. There was a good sense of membership and belonging among the members both at the committee meeting and, in particular, at the smaller branch meeting. The branch meeting members had an extensive and long history (10-15 years as members and friends) of shared emotional connections. There was a sense that the elements of influence and reinforcement also existed strongly in the group. The Progress Association A members had good shared emotional connections and the group had been working together for many years. Their sense of belonging, mutual influence and fulfilment were also quite high, but there was a sense of frustration within this particular group (due to the lethargy of the wider community to become involved) and it was the strong leadership of the group that

motivated them. Neighbourhood Watch Group C showed high levels of sense of community. The researcher gained the impression that members felt a strong sense of membership and belonging and, like the other two groups, had been together for many years, had excellent leadership and had reasonably high levels of mutual influence and fulfilment.

Therefore, it would appear that there are some significant factors that can be looked for when choosing potential neighbourhood groups to work with in this type of program. Most importantly, identifying the groups with strong, enthusiastic leaders is very important. Attempting to assess the sense of community present in an existing community group could also be used as a predictor of a group's likely success in a program such as this one. In order to do this, a researcher would have to follow a similar pattern taken by this case study. It would be necessary to meet with a number of groups and assess these social qualities of leadership and group dynamics. By doing this, a selection of groups with the greatest potential for success could be made and more time and energy could be invested into these groups.

An interesting finding of this study is the multiplier effect, which occurred through word of mouth in the greater community and through contacts at the committee group meetings. As a result of this research project, a number of additional education efforts occurred throughout 1997. Articles on wood-smoke and operation tips have appeared in three community group newsletters, independent of those involved in the program. One public radio interview on the topic of wood-smoke has occurred, and a lunchtime seminar at the Hobart State Library has been conducted which led to a further public meeting on the topic organised by a Hobart community group.

4.3 EVALUATION OF FEEDBACK FROM NEIGHBOURHOOD GROUP LEADERS

Seven out of eight neighbourhood group leaders were contacted by telephone in February 1998 and asked for feedback about the education program and their group's involvement (the eighth group leader was away during the interview period). For bias reasons (see Section 3.3.8), Associate Professor John Todd conducted the calls to the leaders using an interview guide prepared by the researcher. As the results were secondary analysis data (i.e. the analysis of survey data collected by

someone else) (Babbie 1992:262), it was only possible to discuss the important issues raised by the groups in a general manner.

Overall, the evaluation of the education program was very positive, with very few negative statements. Six out of seven groups reported that the wood-smoke issue fitted their group's charter and was relevant to the group. One group reported that the topic was outside their main areas of interest. Six of the groups reported that the program was very worthwhile, very interesting, very well prepared and presented. Four of the groups commented that they would like to be involved in similar environmental projects in the future. Those that did not make this comment were concerned about the demands of other issues on the group's agenda taking up their time. In order to improve the program, one of the groups recommended that a bigger meeting with all members rather than just the committee may have resulted in more members becoming further involved in the program. Another group reported that timing was a problem because the group was already committed to projects through the winter so it was difficult to pick-up the wood-smoke issue. Three of the eight groups have some plans to continue to distribute wood-smoke information in the winter of 1998. Another group leader, who is the National Convenor of the National Council of Women, has circulated the advice about correct use of woodheaters to the other state branches in Australia and claims it could reach 3 million women.

4.4 SUMMARY

These findings demonstrate that established voluntary neighbourhood groups are willing to take on issues that are outside their primary focus. It has also illustrated the multiplier effect at work within community group education. Over time, more actions may result from the stimulus this project has provided. The important aspect affecting group involvement seems to be that there are demonstrated community benefits that will flow from the effort put in by a group.

There were several characteristics common to the three groups that went beyond 'level one' that may have led them to be more successful in the program. Firstly, the core group of members showed a desire to become involved in the program and illustrated enthusiasm and motivation from the first meeting. The groups also had a strong sense of community, group cohesion, and a willingness to participate in the education program. At meetings of these groups the members illustrated the ability

to share ideas and discuss the topic and the education program among themselves. These qualities existed in all of the three groups but occurred to a lesser degree in the other five groups.

The remaining five groups, due to a number of possible factors, were distinctly less motivated and committed to the program. In the case of Progress Association B and Neighbourhood Watch Associations A and B, it seemed that lack of membership, a sense of apathy from participants, loss of motivation, and a lack of observable achievements were presenting major problems for the groups. In Community Group A the lack of involvement may have been more a reflection of the age dynamics of the group. A large proportion of the members were quite old and it became clear at the initial committee meeting that the group was not likely to be suitable for active involvement in the program. Child Health Association B had a large membership and appeared to be a reasonably cohesive group. The most outstanding factor that seemed to limit the group's involvement was poor leadership. Poor leadership skills were common in Progress Association B, Neighbourhood Watch Groups A and B. For example, their communication skills were not well developed, and they were poor facilitators. They were unable to focus the group and draw them into discussion and help them find a direction or clear goal for participation in the program. In essence, they were unable to enthuse the group about the wood-smoke topic or even about their usual activities.

In comparison, the leaders of the three groups that became more involved were very good facilitators, had good organisational and interpersonal skills, were good listeners and demonstrated good diplomacy. The leaders were not heavy-handed but focused the group towards achievable short-term goals and were good at motivating other group members. Certainly, in Progress Association Group A and Neighbourhood Watch Group C, these leadership skills helped the groups maintain strength and a clear vision of the groups' aims and purpose. The committed members and leaders planned to ensure the livelihood of their groups, despite neither having very good wider community support.

Additional factors observed were that poor venues, and a lack of socialising and friendly atmosphere at the meetings also predicted, to some degree, which groups were more successful. Therefore, a holistic approach should be taken when

observing groups and determining those that may be suitable candidates for involvement in an education program.

The results of this case study had a number of limitations. As the program was part of a Master of Environmental Management project, and winter was the appropriate time to promote the information, the program had severe time restrictions. The selection of groups and the educational materials were prepared in the first part of 1997. The groups were not introduced to the educational materials until June/July 1997. It appears from the general observation by the researcher and feedback from the groups that this time frame may have been too short to involve the 'average' voluntary neighbourhood groups because of members' other commitments. To maximise possible involvement it would be more appropriate to provide a longer time frame to allow the groups to become more accustomed to the program and find a role they feel confident in playing. The neighbourhood groups like the Progress Association and Neighbourhood Watch Groups as a rule have fairly low membership. Therefore, there is already pressure to prioritise the groups primary tasks. Nevertheless, this case study has shown that even with such short notice many of the neighbourhood groups made efforts to participate as fully as possible. A further comment provided by feedback from the group's leaders was that the introductory committee meetings, should have included all members. By having greater numbers at the 'introductory' seminar, it could increase the likelihood of a member or members wanting to pick-up the wood-smoke issue. Using this type of feedback could improve the uptake of environmental issues by neighbourhood groups in any future studies. Overall, the findings of the case study have demonstrated the scope and potential for this approach towards community education on environmental issues.

5 TELEPHONE SURVEY: RESULTS AND DISCUSSION

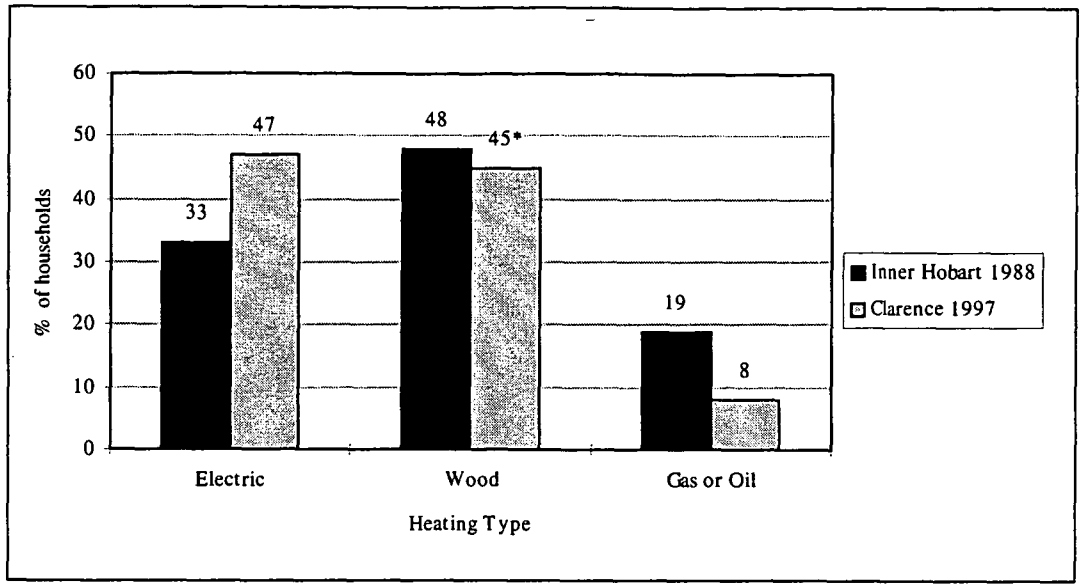
In order to assess the impact of the article in the Clarence City Council newsletter, one hundred households were telephone surveyed between the 8th and 26th of September 1997. The sampling technique, study site and statistical analyses used were discussed in Chapter 3. The survey contained five sections, the questions in the first two sections were asked of all respondents and addressed heating types, perceptions about wood-smoke, and hypothetical actions on how to control wood-smoke pollution. Section 3 asked woodheater owners about wood-smoke educational materials, including specific questions asked about the council newsletter article. Section 4 of the survey addressed the current operational techniques of woodheater owners.

5.1 DEMOGRAPHICS

The subjects were categorised into three age groups: 'Young', representing subjects aged under 20 through to 39 years; 'Middle', including those between 40-59 years; and 'Older', representing those aged 60 years and above. Of the 100 subjects, 31% were 'Young', 36% were in the 'Middle' age group and 33% were in the 'Older' category. There was a reasonably even gender distribution amongst the respondents, with 42% male and 58% female.

5.2 HEATING TYPE

Subjects were asked to state the main type of heating used in their households. The results indicate that in the Clarence municipality surveyed, electricity is the predominant primary heating source (47%), followed by wood (39%). Six percent of households use wood as a secondary heating source to electricity, and a further eight percent use oil or gas. Hence, of those households interviewed, 45% use some woodheating. In comparison, in 1988, the National Fuelwood Study reported that 48% of households in inner suburbs of Hobart used wood to satisfy their main heating requirements (Todd *et al.* 1989:32). Figure 5.1 illustrates the findings of the Clarence survey in 1997, as compared with the 1988 results.



* Wood as a secondary heating source has been added to the wood category
Source: Todd *et al.* (1989:32) National Fuelwood Study

Figure 5-1 Comparative heating types in inner Hobart households (1988 and 1997).

The Clarence municipality that was surveyed included a number of inner Hobart suburbs. As the survey was not as extensive as the National Fuelwood survey conducted in 1988, it would only be appropriate to comment on any trends in reported heating types used in households. Results of the Clarence survey indicated that heating with wood maybe slightly decreasing in inner Hobart. Interestingly, a possible trend is that heating with electricity has increased in inner city suburbs (33% to 47%). Anecdotal evidence from the telephone survey suggested that many respondents felt that wood was becoming more expensive, and that it was highly inconvenient and hard work to chop and carry wood. This view has emerged in parallel with the Tasmanian Hydro-Electric Commission's pro-active marketing campaign focusing on electric heating as a 'green, easy and comfortable heat'.

5.3 PERCEPTION OF AIR QUALITY AND WOOD-SMOKE

In relation to the respondents' perception of air quality in Hobart during winter, 48% reported air quality was either very good or good, nearly a quarter of the sample (24%) reported it was bad or very bad, and 28% felt it was neither good nor bad. Therefore, the majority (76%) of respondents stated that, in their experience, the quality of air in Hobart is not something they particularly notice or else they view it as of good quality. Recent research has indicated that wood-smoke

pollution in Hobart, in 1997, was lower than previous years (Limwathanagura 1997:66). Perhaps the respondents' perceptions about wood-smoke in Hobart reflects this recent finding. In addition, because the effects of wood-smoke are often localised, it is possible that the quarter of respondents that reported air quality as bad or very bad may live in an area that is susceptible to trapping wood-smoke. The Clarence survey reported that 46% of those surveyed did not know whether wood-smoke levels had increased in the last year, 32% reported that it had got worse, 12% felt it was the same, and 10% thought it was better.

The Commonwealth Government's 'Breathe the Benefits' education campaign (discussed in detail in Section 2.1.5.1), surveyed Hobart residents and reported that 17% of respondents thought wood-smoke was a major nuisance, 42% a minor nuisance, and 40% reported it was not a nuisance at all (Attwater and Thorp 1997:39). Therefore, it would seem that, for around half of the population in Hobart, wood-smoke and its affect on air quality is not seen as a problem.

In Launceston, wood-smoke pollution is of greater concern for the residents. In 1992, a telephone survey of Launceston residents reported that 37% thought air pollution was a serious problem during winter (Todd and Brett 1992:4). In 1997, the 'Breathe the Benefits' survey asked people in Launceston to what degree they found wood-smoke pollution a nuisance, 31% reported it was a major nuisance, 51% a minor nuisance, and 17% felt it was not a nuisance at all (Attwater and Thorp 1997:39). Therefore, approximately 30% of the population reported having concerns about air quality in winter, and the number of people concerned has not changed very much since 1992.

5.4 COMMUNITY RESPONSIBILITY AND AIR QUALITY

It is important that the wider community recognise the contribution of residential sources to air pollution. If they are expected to play a role in change they must feel a sense of responsibility to help the change to succeed. In order to determine if people felt a sense of responsibility for air quality, respondents were asked if they thought the local community could play a role in improving air quality. Some 42% reported local community could play a 'very important role', 45% felt they could play a 'somewhat important role' and 13% believed it could not have an important

role or they did not know. Therefore, the majority of respondents recognised that their local community can have an impact on air quality.

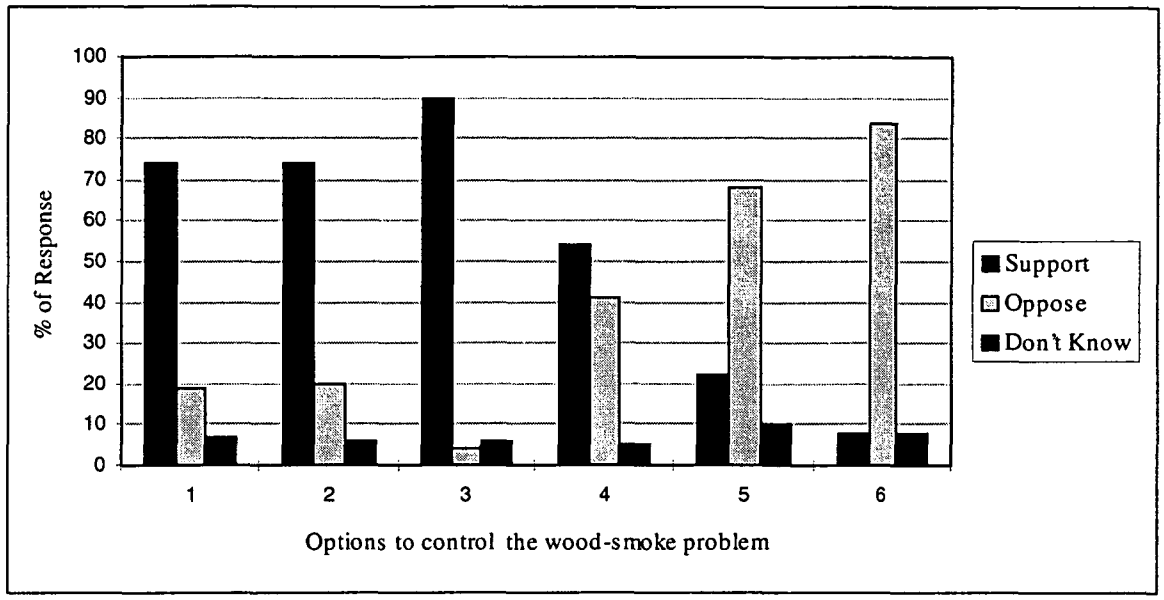
An open-ended question asking people to indicate the main sources of air pollution in Hobart revealed that the majority of respondents identified woodheaters as the major source of air pollution in Hobart. Other sources identified included motor vehicle emissions and industry, for example, the EZ Zinc Works factory. This recognition of wood-smoke as a residential cause of pollution, together with a sense of responsibility for air quality, is an important starting point if people are to take actions to reduce wood-smoke.

5.5 CONTROL OPTIONS FOR WOOD-SMOKE POLLUTION

Question 2.4 of the telephone survey related to a range of hypothetical options that could be taken to control wood-smoke pollution. Respondents were asked to indicate the degree to which they supported or opposed each. Figure 5.2 illustrates the percentages of survey responses to these possible actions. Respondents generally supported the first three options to control the wood-smoke problem. Spreading information on operation techniques through word of mouth in communities was strongly supported (74%) as a good control option for wood-smoke pollution. This suggests that people support interpersonal communication between friends, acquaintances, neighbours and family in spreading such messages. The way in which the message about correct operation of heaters is communicated to the public is an important first step. By using neighbourhood groups to disseminate wood-smoke educational information, it may be possible to begin a multiplier effect in which word of mouth may be effective. An association was found between the variables age and the action of information being spread through word of mouth in communities [$\chi^2(8)= 16.44, p< 0.05$]. Younger people were thus most likely to support this option for control.

The majority of respondents (74%) supported the option of putting correct woodheater operation information in letterboxes of homes with smoky heaters. This result suggests that people find it appropriate to target those who are causing the wood-smoke and educate them specifically. The majority (80%) also supported the option of expanding community education campaigns. This finding reveals that people are supportive of education as a means of solving the wood-smoke problem

and would respond favourably to local and national government developing further education campaigns.



Legend	
1. Word of mouth through communities	4. Local Government give warnings and infringement notices
2. Letter box information to smoky households	5. Ban on high pollution days
3. Expand community education	6. Total ban

Figure 5-2 Telephone survey responses to various options to control the wood-smoke problem.

The last three options to control the wood-smoke problem proved to be more controversial. In terms of local government handing out either infringement or warning notices to households with smoky heaters, 54% supported the action, while 41% opposed the action. While this disincentive approach (e.g. a fine and/or social pressure through a warning notice), was not supported strongly by the respondents, more than half did regard such an option as appropriate. To the option of banning the use of woodheaters on predicted high pollution days, 21% stated their support and 68% were opposed.

The opposition to these more stringent mechanisms of controlling pollution may be explained by two factors. Firstly, the results of this survey and others indicate that residents in Hobart do not perceive the wood-smoke problem to be of a significant magnitude. It would seem at least plausible that resident's perceptions of the problem are reflected in the degree to which they are opposed to the more stringent and direct methods of controlling the pollution. Secondly, people were aware that

many Hobart residents use woodheaters as their only heating source and concern was, therefore, raised that it would be socially unjust for people to be asked to curtail the use of their woodheaters on very cold days, precisely when the heating would be needed.

In response to the action of banning woodheaters totally, only 8% thought this would be a good idea, while 84% were opposed to the action. The opposition to banning woodheaters was uniform across the different heating types. For example, 86% of respondents with woodheaters were opposed to banning, compared with 87% of electric, gas or oil heater owners. This widespread opposition shows that it is not just a matter of woodheater owners expressing concern over potential financial loss. The opposition to banning suggests that the general community, sampled in Clarence do not find the wood-smoke problem severe enough to warrant such action.

5.6 EFFECTIVENESS OF THE CLARENCE CITY COUNCIL NEWSLETTER ARTICLE

Sections 3 and 4 of the telephone survey were completed only by woodheater users who were asked whether they received the Clarence City Council newsletter and whether they had read and could recall any information contained in the wood-smoke article. Forty-five out of the hundred surveyed were woodheater owners. Of those, 40% remembered getting the newsletter, 25% did not receive the newsletter and 36% did not know if they had received it or not. Of the woodheater owners who remembered getting the newsletter, 7% saw and read the article and 2% (1 person) reported learning something.

This finding reveals that this particular effort to reach the community through a newsletter was not very successful. A number of factors may have seriously biased these findings. This newsletter was distributed with the rate notices, and therefore would not have reached residents occupying rental properties. If the survey had been completed in a shorter time frame, the likelihood of people recalling the material may have increased. However, it could be argued that if the respondents did not recall the information a few weeks after it was received, it was not likely to have a long-term impact on their attitudes and behaviour.

As stated in Chapter 3, the wood-smoke article appeared in a special edition of the Clarence City Council newsletter called Merger News, which discussed the controversial topic of a proposed merger of the Clarence City Council with the Hobart City Council. When asked if they had read the newsletter and the article, many respondents emphasised strong opposition to reading the newsletter because of its political nature and this would have affected exposure to the wood-smoke article. Anecdotal evidence also suggested respondents do not respond favourably to the council publication because it came with the rate notice. Given this anecdotal evidence of lack of enthusiasm to read the newsletter, together with the fact that the article was placed on the final page of the newsletter, this evidence of the ineffectiveness of newsletter articles may be biased. With these factors in mind, it would be inappropriate to generalise about the effectiveness of the other types of newsletters used in this study. The 'Breathe the Benefits' survey in Tasmania, in 1997, found that newspaper articles were the second most effective medium for transferring information after television (Attwater and Thorp 1997:25). As discussed in Section 5.8 below, many of the respondents in this study reported that newsletters and newspapers would be an effective means of getting information to them.

5.7 PREVIOUS EXPOSURE TO WOOD-SMOKE EDUCATIONAL MATERIALS

In order to determine what previous knowledge the survey population had about the wood-smoke issue, respondents were asked if they had seen any other types of educational material relating to the correct operation of woodheaters. Figure 5.3 illustrates the responses and reports the types of materials seen by the different age groups. From these results, 61% of younger people, 53% of middle aged people and 55% of older people, did not know or had not seen any educational material in the past 12 months. In the Commonwealth survey, when respondents were asked if they were aware of the "Breathe the Benefits" campaign over the winter of 1997, 65% of people in Hobart reported that they were aware of it (Attwater and Thorp 1997:9). The Commonwealth survey was conducted between July 31st and August 11th, 1997. This Clarence survey was conducted throughout September 1997. Some of

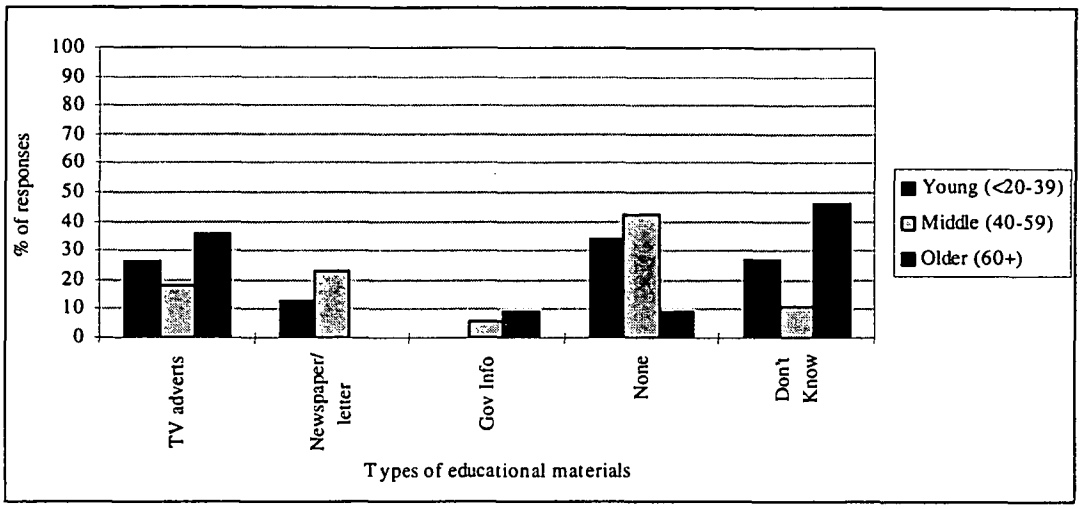


Figure 5-3 Exposure to various forms of educational material on the correct operation of woodheaters within the past twelve months (by age group).

the discrepancy in these findings might be explained by the design of the question asked by the 'Breathe the Benefits' survey about the education campaign. It asked respondents 'Have you been aware of the Breathe the Benefits wood-smoke education campaign in the media over the winter?. As discussed in Section 3.9.2.2, the wording of this question could be susceptible to 'social desirability' responses. Apart from this factor, the smaller sample size and study site of the Clarence survey would have limited the degree to which these findings could be compared to the 'Breathe the Benefits' survey. However, it may illustrate the immediate impact of mass media campaigns and their lack of long-term influence on the attitudes and behaviour of the message receiver. In the Clarence survey, 26% of young people, 18% of middle age and 36% of older people recalled seeing television advertisements about wood-smoke pollution. It is assumed these advertisements were those produced for the "Breathe the Benefits" campaign. In addition, 13% of young and 23% of middle aged people reported seeing newspaper articles on the topic in 1997. Generally, however, those that reported being exposed previously to educational materials relating to the correct operation of woodheaters did not recognise it as government information.

5.8 EFFECTIVE MEDIA FOR DISSEMINATING WOOD-SMOKE INFORMATION

Woodheater owners were asked to nominate the most effective medium that could be used to get wood-smoke information to them. The responses of each age category to the preferred media question are illustrated in Figure 5.4. The majority of woodheater owners surveyed in the Clarence region were under 60 years of age. In both the young and middle-age groups, 45% of the householders used wood as their primary heating source, compared with 27% of the older age group. This information indicates that, in the sample surveyed, wood-smoke educational material should be targeted at young and middle-aged groups. Younger people self-reported that the best medium to transfer educational material about correct woodheater use would be through television advertisements (80%), followed by newspapers/newsletters (73%), followed by television programs (73%) (i.e. a whole segment on a lifestyle program about the wood-smoke problem with demonstrated operation tips). Middle-aged people reported they are best reached either through television programs (95%) or television advertisements (95%). In comparison, people over 60 felt they would be best reached through television programs (91%), followed by community groups (82%) and television advertisements (72%).

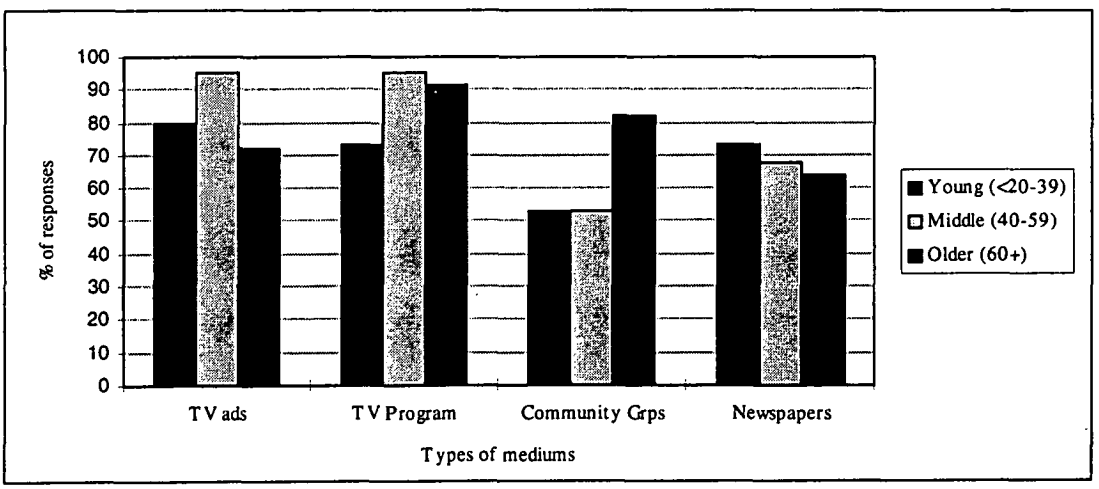


Figure 5-4 Responses to the question of what is the best medium for disseminating information relating to the correct operation of woodheaters (by age group).

These findings support those in the 'Breathe the Benefits' survey of Hobart residents, which reported that, in terms of media effectiveness, television was the

most effective overall, followed by newspapers and radio (Attwater and Thorp 1997:27).

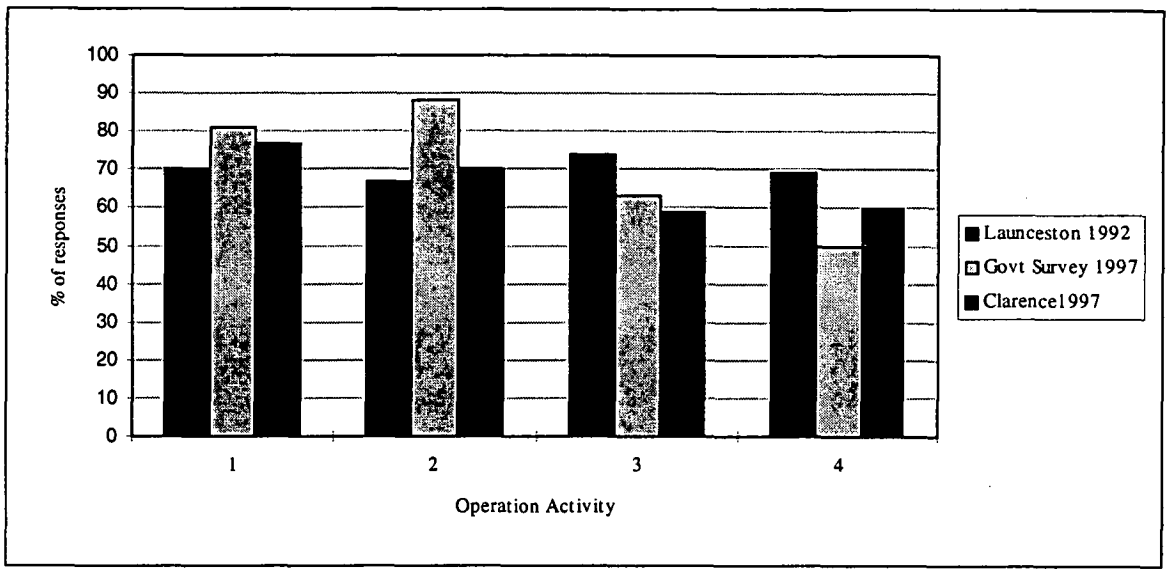
These results suggest that television was the medium that people nominated as the most effective way to educate themselves about correct woodheater operation. This does not necessarily refer only to television advertisements. The Clarence survey results suggest a segment on a 'lifestyle' program could be very effective. It would provide time to place the information in a context, not just telling people brief tips but explaining why they need to change their present behaviour. By using a judicious selection of people and situations, a segment on a program could be designed to model behavioural change and train viewers in correct operation behaviour. Researchers have reported that modelling and training is thought to be important in the adoption of conservation behaviour (De Young 1993:488). For example, a demonstration by a credible source on how to light a good fire and manage a woodheater may provide people with the skills and motivation to proceed with correct operational techniques.

Education through community groups was reported as an effective way of getting information to the older age group but not the younger and middle-aged groups. Younger people, in particular, are poorly represented in community groups and this probably reflects a general disinterest in these types of neighbourhood organisations and would explain why half reported that community groups were unlikely to be a medium that would supply them with educational materials. Fifty percent of middle-aged respondents also reported they were unlikely to be reached via community groups. Perhaps this is due to many of this age group being working professionals who are more likely to receive information on television or through newspapers.

5.9 CURRENT OPERATIONAL TECHNIQUES

In Section 4 of the telephone survey, woodheater owners were asked about their current operational techniques. The findings of the Clarence survey were compared with a previous survey conducted in Launceston in 1992 by Todd and Brett, and the 'Breathe the Benefits' survey of 1997. The 1992 Launceston study, surveyed the woodheater use of one hundred households and was produced by the Centre for Environmental Studies as part of a series of papers in the field of fuelwood

research. The Clarence survey described here purposely used similar questions to these other two studies so that comparisons could be made between all three surveys. Figure 5.5 illustrates the self-reported frequency of correct operation techniques used by woodheater owners in the three surveys.



Legend (Yes, to the following)	
1. Do you check to see if the heater is smoking?	3. Do you overnight burn?
2. When you refuel do you run it on high for 15-20 minutes?	4. When you overnight burn, do you run your heater on high for 15-20 minutes before turning down the air supply?

Figure 5-5 Comparisons of the frequency of selected correct operation techniques used by woodheater owners in Launceston 1992 and Hobart 1997.

Although the 1992 survey and the Clarence and Commonwealth Government surveys were conducted in two different locations, Hobart and Launceston, it is still interesting to compare the findings and see if there have been changes in the frequency of self-reported operational behaviours. By comparing the two smaller surveys, there appears to have been minimal changes in the frequency at which respondents reported carrying out best practice operational techniques with their woodheaters over a 5 year period. Interestingly, when operator behaviour was examined in the "Breathe the Benefits" pre-and post- campaign surveys, greater changes in behaviour were reported. In Hobart, prior to the 'Breathe the Benefits' campaign, 71% reported that they checked their smoke levels, either always or occasionally, and after the campaign 81% reported carrying out this activity. Hence, there was a 10% increase in the behaviour (Attwater and Thorp 1997:48).

In terms of reloading, 81% reported burning on high for at least 20 minutes prior to the campaign and, after the campaign, 88% reported burning on high (Attwater and Thorp 1997:59). These figures are greater than those found in the Clarence survey.

The Clarence survey reported that 58% of woodheater operators overnight burn. The majority (85%) of woodheater operators were aware that there always needs to be a good flame in the heater. Some 47% of respondents reported that they knew that log arrangement in the heater influenced how much smoke was produced. Only 25% of respondents claimed to frequently act to decrease the amount of smoke produced, and 43% do so occasionally.

The 'Breathe the Benefits' survey had a much greater sample size, and therefore the survey findings would have experienced less bias. However, whether the higher percentages of participation in correct operational techniques recorded in the "Breathe the Benefits" campaign is a long-term effect remains to be seen. Evidence suggests that mass media campaigns do not have long-term influence in changing behaviour (as discussed in detail in Chapter 2) (Rogers 1995:169; Dennis *et al.* 1990:1113). As the Clarence survey conducted in September 1997 did not reflect the 'Breathe the Benefits' survey results, it may be that the changes in behaviour had already been extinguished.

Overall, from the findings of the 'Breathe the Benefits' survey and, to a lesser degree, the Clarence survey, a large proportion of the woodheater owners have a reasonably sound understanding of correct operation techniques. However, continuing high levels of wood-smoke in winter in Hobart suggest there still is a problem. There are a few reasons why this could be occurring. It is possible that the sample population being surveyed were overestimating the frequency with which they participate in correct operational techniques. As discussed in Section 3.9.2.2, the questions related to operational techniques in all three surveys are written in a leading manner and are vulnerable to an effect called 'social desirability'. This means that it is reasonably easy for a respondent to work out what is the correct answer and the respondent may answer in a manner that will 'make them look good'. This could have influenced responses in all three surveys, except for the 'Breathe the Benefits' survey's question on overnight burning, which was not written in this manner.

Alternatively, this information might suggest that a greater effort needs to be made to target the population (17%-20%) that are contributing about 33% of the smoke from woodheaters (as discussed in Section 2.5.2.2) (ACC 1997:12). If the figures on current operational techniques are correct then educational efforts are probably being directed at those who are already operating their woodheaters correctly. There is then a need to focus on the households contributing disproportionately high loads of smoke into urban areas. Interestingly, a drive through neighbourhoods with high proportions of woodheaters does suggest that a few heaters are emitting far greater quantities of visible smoke than others.

Overall, the major findings of this telephone survey were that in Clarence there may be a trend away from woodheaters as a primary heating source. This trend would help reduce wood-smoke levels without further action. As options to control the wood-smoke problem: the majority of those surveyed were opposed to banning heaters or restricting their use; and word of mouth and education campaigns were preferred to disincentives such as fines or warnings. City Council newsletters may not be effective means of disseminating educational materials. Finally, a segment on a 'lifestyle' television program may be the most effective means of demonstrating correct woodheater operational techniques to all age groups.

6 INFORMATION KIT ASSESSMENT: RESULTS AND DISCUSSION

This chapter presents the results of the assessment of the educational materials prepared for the case study in order to estimate the potential effects of the materials. This assessment was achieved in two ways. Firstly, the pamphlet was sent to nine experts in producing environmental education materials for comment and secondly, people exposed to the seminar material were asked to complete a questionnaire to provide feedback on the presentation.

6.1 RESULTS OF EXPERTS' EXAMINATION OF PAMPHLET

Nine experts in Australia involved in producing educational materials were asked to participate in filling out a pamphlet assessment questionnaire. Individuals from the following government agencies: New South Wales EPA; South Australian EPA; Environment ACT; Department of Environment QLD; Department of Environmental Protection WA; Environment Australia; the Tasmanian Environment Centre Inc.; and the Energy Information Centre in Adelaide, completed the questionnaire between October and November 1997. The Victorian EPA was the only agency unable to complete the questionnaire. The questionnaire addressed the following topics: attraction; comprehension; acceptability; personal involvement; and persuasion (see Table 6.1).

Table 6-1 Responses of the eight experts to questions assessing the pamphlet.

Sections and Questions	Response: Yes	Response: No
Attraction:		
Does the pamphlet create interest?	7	1
Will it attract attention?	7	"Some"
Comprehension		
Is the pamphlet easy to understand?	7	1
Is there anything confusing?	5	3
Acceptability		
Is there anything irritating or offensive?	1	7
Personal Involvement		
Does the pamphlet seem to be personally directed at the reader?	7	1
Persuasion		
Is the pamphlet convincing?	8	0
Does it seem to persuade the reader to do something?	8	0

To analyse this qualitative data, the responses of the experts were recorded and general patterns or themes in the data were pooled together. Each section of the questionnaire had questions that required a yes or no response but allowed room for comments. In Table 6.1 the responses to the questions are reported for the eight respondents. Overall, the pamphlet was well received by the majority of the experts. The results will be discussed by topic: attraction; comprehension; acceptability; personal involvement; and persuasion.

6.1.1 Attraction

The first section of the questionnaire addressed attraction. Respondents were asked to comment on whether the pamphlet created interest and would attract attention. They were also asked to state what they liked most and least about the material. As illustrated in Table 6.1, the overwhelming response was that the pamphlet was successfully designed to create and attract attention. Respondents were impressed with the graphics, and some of the comments included that they liked the 'friendly presentation', the 'good slogan and pictures', that the 'diagrams were very good with a little bit of humour' and that the 'illustrations spoke to you'. Further comments included that the 'front cover is eye catching and invites people to read further'. One individual commented that more colour would have been good. Unfortunately, budget restrictions limited this aspect of the design.

There was also positive feedback on the clarity of the written material, such as it had 'clear and concise info' and it was 'clear but did not preach'. Some respondents commented that they liked the 'Guide' section of the pamphlet, they felt the 'guide tells you what to do' and that the 'guide was well set out and easy to read' and that the 'instructions for lighting are very helpful'. Another said they 'liked the separation of the red bordered guide section from the background information which may not interest all readers'. However, some respondents disagreed with these comments in relation to the guide. For example, a respondent commented they were 'not sure what to read first'. The pamphlet was written so that there was no correct direction in which the 'Guide' section should be read because all the information was of equal importance and was all interrelated.

Another problem that some respondents mentioned related to the layout and ordering of the material. This mainly concerned the sequence in which information was

ordered in the pamphlet. For example, a respondent stated 'ordering of info could be improved (e.g. last section "where does smoke comes from?" could be closer to the front'. Another respondent said moving the last section "Community Participation" to the beginning would make the pamphlet 'more personal'.

6.1.2 Comprehension

In this section, respondents were asked whether the pamphlet was easy to understand or if there was confusing information in the pamphlet. Seven out of the eight respondents reported that the pamphlet was easy to understand. Five respondents commented on some aspects of the information they felt could be confusing. The main problem reported was in relation to the layout sequence and the reading order of the guide, which was discussed above in Section 6.1.1. Although some 'thought it was easy to understand' and 'very readable', others felt it had 'too many words' or was 'very wordy, yet I think the information is necessary'. Another comment was that the words 'exacerbate' and 'aggravate' are difficult, and often confusing, words. Another respondent also commented that these terms may be 'too technical'. A further concern was that 'the reference to 12-20% moisture content may be a little confusing if people have no way of measuring this'.

6.1.3 Acceptability

This section asked if the respondents felt there was anything offensive or irritating in the pamphlet. Seven out of eight respondents reported that they did not find anything irritating or offensive. The other respondent felt that the pamphlet used 'slick advertising lines' that were offensive or irritating to them. The pamphlet was not written intentionally to contain this type of writing and the respondent did not give specific examples. Another respondent advised that the 'Australia diagram does not add to the text or message'.

6.1.4 Personal Involvement

The respondents were asked if the pamphlet seemed to be directed personally at the reader in this section. Seven out of eight respondents found the pamphlet was personally directed at the reader. For example, one respondent wrote 'the language is friendly and conversational'. As mentioned in section 6.1.1, one respondent felt

that having the "Community Participation" section nearer the front of the pamphlet would help make it more personal. Another wrote, 'yes in parts' and another wrote 'yes but doesn't preach'.

6.1.5 Persuasion

In this section, respondents were asked if the pamphlet was convincing and would persuade the reader to do something. All the respondents concluded that the pamphlet was convincing and persuasive. For example, one respondent wrote that it was 'very persuasive' and that it had 'enough information on the pollutants and problems, made relevant to Tassie and gives advice for personal action'. Another respondent commented that 'the pamphlet is convincing, it explains the message thoroughly to the reader'. Yet another respondent wrote that 'the information is well presented in a convincing manner, ...it encourages without preaching and cajoling and would be effective in influencing behaviour'.

6.1.6 Additional Comments

At the end of the questionnaire respondents were asked to make any other further comments. Several comments were made including that the message could have been 'more concise' and one of the respondents suggested that it may have been better to 'omit "Hot spot in Australia"' in order to reduce the amount of text. Another commented that the graphics looked like they were done by different people, however this was not the case. Comments were made about other messages and information they would have liked to receive. One respondent from northern Australia, wrote that an additional message could have been, that 'you can contribute to air quality by rugging up some nights instead of using the fireplace'. This message would have to be adapted in Tasmania, as winter nights are generally cold enough to warrant a fire. Another respondent commented that they would want information on: choosing heaters; greenhouse gases; second-hand heaters; and how to tell if a heater meets AS 4013 standards. Another respondent would have liked some positive comment like, 'wood is a renewable energy resource and is Greenhouse neutral (providing trees are being planted)'. Finally, a respondent commented they 'liked the presentation and folding' and another finished by commenting that they thought the pamphlet 'was very good'.

6.1.7 Summary

The pamphlet was produced as part of the information kit prepared for the neighbourhood groups in the case study. Hence, the pamphlet was in its final state of production when it was given to the experts to evaluate. If it were a longer-term study, some of the feedback from the expert panel would have been incorporated to further refine this pamphlet.

The graphics in the pamphlet were provided by a graphic designer who specialised in cartoons. The feedback from the experts indicates that the use of cartoons was successful. The cartoons made the pamphlet approachable, friendly and a little humorous, which would encourage people to read the whole pamphlet. Greater diversity of colours in the design of cartoons may have been appropriate if greater funding and time had been available.

In terms of the 'Guide' section, there was debate amongst the experts as to the success of the separation and ordering of the text within this section of the pamphlet. It would be possible to clarify and make the section more structured and easier for the reader to follow. However, the separation of the correct operational techniques from the remainder of the pamphlet was an important distinction.

In terms of the ordering of the text within the pamphlet, some of the comments put forward by the experts in section 6.1.1 were incorporated. As the primary audience was neighbourhood groups, it may have been helpful to emphasise the importance of community participation in improving wood-smoke pollution earlier in the pamphlet. However, many sections should remain in the present sequence. For example, health risks were stressed early in the pamphlet to create interest and the somewhat more technical explanation about the production of wood-smoke, was placed on the final page to ensure readers did not get bored before reading the operational tips. In many ways, the technical information was provided for readers who were more interested in the topic.

Although the experts generally thought the pamphlet was easy to understand, there was concern expressed about some confusing words and concepts. Further clarification is needed on the concept of moisture levels in wood, and an effort could be made to remove words that are too technical or confusing.

The majority of experts did not find anything offensive or irritating in the pamphlet. However, a valid comment was made, that the Australia diagram did not add to the text or message. This could be removed which would reduce the length of the pamphlet. All the respondents reported the pamphlet was convincing and persuasive, therefore, little alterations would be made in relation to this in the pamphlet. Further sound comments that could be considered, included making the message more concise, particularly in the 'Guide' and 'Hot spots in Australia' sections. A range of ideas for additional content were put forward by the experts in Section 6.1.6. Some of these ideas would be accepted and others would be rejected. The message about the wood-smoke problem and correct woodheater use is inherently large and complex. It was not deemed appropriate to further complicate the issue by discussing Greenhouse issues, as one expert suggested. Including such a suggestion would have considerably lengthened the pamphlet. Given that the pamphlet was about local urban air pollution, keeping the topic focussed on this context was important. However, important additional information that the researcher would consider including would be advice on second-hand heaters, and how to tell if a woodheater meets the AS 4013 standard. Overall, given the time and financial restraints, the pamphlet appeared to be of high quality and this is reflected in the overall comments of the experts.

6.2 RESULTS OF SURVEY AT SEMINAR MEETING

In order to assess the quality of the seminar material, a post-seminar survey was distributed at public meetings, organised by the voluntary neighbourhood groups. These meetings were conducted during the months of September and October in Hobart. Surveys were given out at four meetings which were organised by: a regional Child Health Association (CHA) group in an inner Hobart area; a Neighbourhood Watch (NHW) Group in an inner Hobart area; a Progress Association in an inner Hobart area; and a neighbourhood community group in an outer Hobart suburb called Fern Tree (see Figure 3.3). The later group was not one of the eight groups participating in the case study. They became involved as a result of a previous public meeting conducted at the State library. At these meetings, the researcher presented the wood-smoke seminar materials produced for the information kit. The survey was distributed to attendants of the meetings asking

them for their opinions on the wood-smoke problem and to comment on the presentation of the seminar.

From the four meetings, 32 surveys were completed. The attendance at the meetings varied. At one of the meetings, there was such low attendance that no surveys were distributed. Of the other three meetings, two (CHA and NHW) had fairly average attendance (8 people each), and participants were similar in their level of general enthusiasm, in the age distribution of respondents and they were both located in inner Hobart areas. The other meeting, located in an outer Hobart area, was well attended (16 people) and the group was very enthusiastic. For the purpose of comparison, it was decided that the results of the CHA and the NHW meetings in inner Hobart be pooled together. These two meetings grouped together will be referred to as Group A and the remaining group will be called Group B.

6.2.1 General impressions of attendants at the seminar meetings

To gain an overall impression of how the attendants at the meetings responded to the seminar materials, the findings from all three seminars were pooled together. Of those surveyed at the seminars, 50% of the respondents used wood as their primary heating source. All had a woodheater, either free standing or fitted into an existing fireplace. Some 28% used electricity as their only heating source, 3% used oil or gas and 19% had a combination of wood and electricity. Of those using a combination of wood and electricity, 40% had a woodheater and 60% had a combination of open fires and a woodheater that they used occasionally. Therefore, in total 69% of those who attended the meetings were woodheater owners and operators.

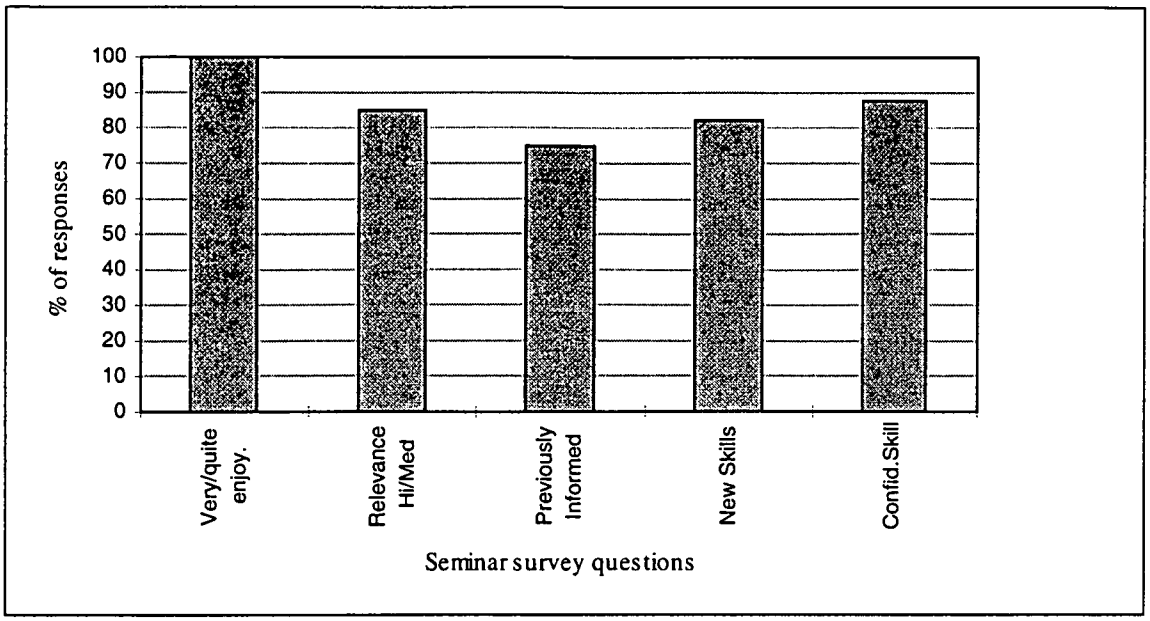


Figure 6-1 The overall impressions of all attendants at the seminars.

As shown in Figure 6.1, all of the respondents reported either very much or quite enjoying the presentation and, everyone reported fully understanding it. Of those who reported the seminar was 'very enjoyable'(50%), 75% found the information of high relevance to them, 20% found it of medium relevance and 5% not relevant. Of the respondents that felt the presentation was 'quite enjoyable'(50%), 56% found the information of medium relevance, 19% found it of high relevance, 19% found it of low relevance and 6% thought it was not relevant. As one would intuitively expect, personal relevance of the information was found to have a significant association to the level of enjoyment of the presentation reported by respondents [$\chi^2(3)= 10.4$, $p< 0.05$]. In terms of respondents' previous knowledge on the topic, 75% felt they were reasonably well informed before the seminar, yet 82% felt they learnt something new and 88% felt confident using the new skills.

Based on the theory of information-processing presented in Chapter 2, these findings suggest that the information from the seminar met the criteria necessary to increase the likelihood of effective transferral of a message. Everyone understood the material, a high proportion found the seminar interesting, relevant and learnt some new skills and had the confidence to carry them out. Interestingly, a high proportion of respondents felt that they were reasonably well informed on the topic prior to the seminar.

Unfortunately, it is not possible to comment on how this may have affected uptake of any new information without further investigation. If the study were more long-term, follow-up research would have been conducted on how the information has, or has not, influenced the operating behaviour of woodheater owners who attended the seminar.

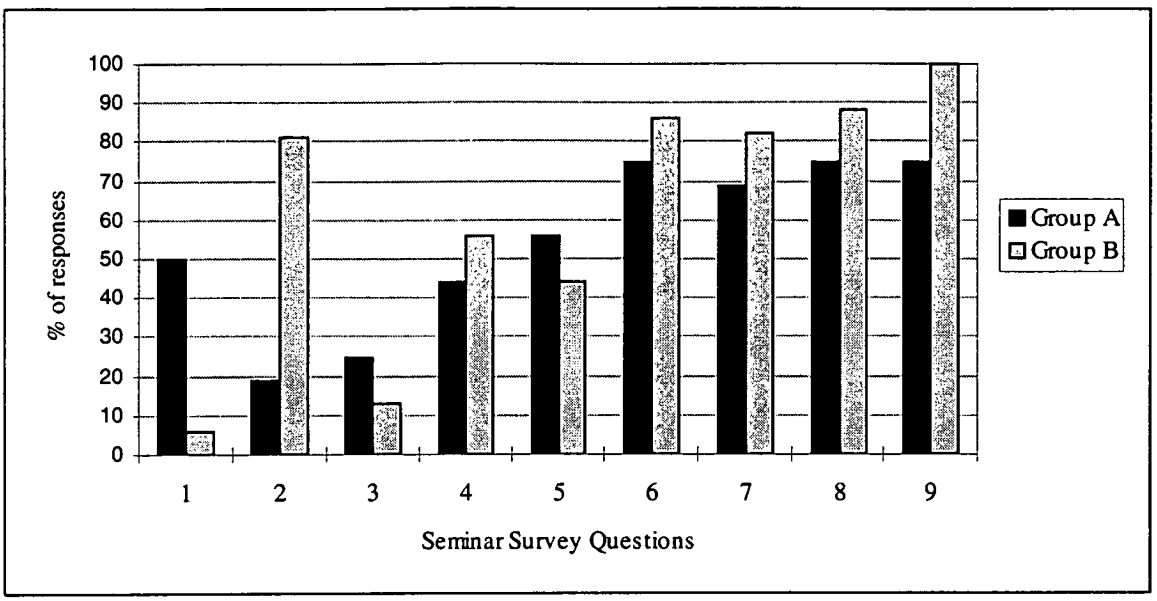
All of the neighbourhood groups involved in organising public meetings had strong leaders but, from the researcher's perspective, they had differing degrees of 'sense of community' (see Chapter 3). It was predicted that the differences in the levels of enthusiasm and sense of community may have influenced responses, within the groups, to the seminar materials. Also, it was predicted that respondents without woodheaters would feel less interested and less concerned with the seminar material. For these reasons the results of Group A and Group B were examined for differences and the results are shown in Figure 6.2. Table 6.2 displays the characteristics of the groups.

Table 6-2 The characteristics of Group A and Group B.

Group	Number at Meetings	Age Distribution	Level of Leadership 1 is low/ 5 is high	Primary heating source type
A	16	75% 50-60 yrs 25% 30-40 yrs	5	50% Electric 19% Wood 25% Wood + Electric 6% Gas or Oil
B	16	19% 20-30 yrs 50% 30-40 yrs 32% 50-60 yrs	5	6% Electric 81% Wood 13% Wood + Electric

The sample size for the surveys was small (32) and therefore, percentage differences of survey responses between the groups on a number of categories are not statistically significant and should be viewed with caution. As Group B showed a high level of woodheater ownership it was predicted that this group would illustrate a high level of interest and report that the information was relevant to them. The results indicated that, in Group B, 56% of respondents found the presentation very interesting and enjoyable and 44% reported finding it quite interesting and enjoyable. In Group B, 75% of respondents found the presentation highly relevant and 25% reported it has having medium relevance. In comparison in Group A, 44% found it very interesting and enjoyable and 56% found it quite interesting and enjoyable. Whilst only 19% reported the information as highly relevant, 50%

reported finding it of medium relevance and 31% found it of low or no relevance. Based on knowledge about information processing (see Chapter 2), these findings would indicate that respondents in Group B would be more likely to be influenced by the wood-smoke message. This is because they found it more enjoyable and more relevant.



Legend
1. Electricity as main heating source
2. Wood as main heating source
3. Combination of wood & electric for heating
4. Presentation was very interesting & enjoyable
5. Presentation was quite interesting & enjoyable
6. Presentation was of high or medium personal relevance
7. Felt well informed on the topic prior to seminar
8. Reported had learnt new skills
9. Reported had confidence to use new skills

Figure 6-2 Comparison between Group A and Group B responses to questions about the seminar presentation.

As stated in Chapter 2, the amount of information processing effort we put into a new message or information depends on whether or not the issue is personally relevant. When people enjoy a presentation and, therefore, are attentive, alert and not distracted, and find it relevant, any changes in attitudes and behaviour are more likely to persist (Zimbardo and Leippe 1991:209). This is not to say that Group A was not internalising information from the seminar, but it is possible that the message transfer may not be as effective with this particular group when compared with Group B.

As explained in Section 2.5.3.1, any previous knowledge an individual has on a particular topic can influence the likelihood of them adopting new information on the same subject. Cognitive dissonance and selective exposure can impact on the success or failure of a message getting through to the receiver. For this reason, the groups were asked to state whether they felt well informed on the topic of wood-smoke pollution and heater operation techniques. In Group B, 81% expressed feeling informed about the issue of wood-smoke pollution and heater operation compared with 68% in Group A. Clearly, with greater woodheater ownership in Group B, it is more likely those respondents may be more aware of information pertaining to the issue. However, from these findings it is not possible to comment on which way the attendants at either meeting may have felt about the wood-smoke issue. However, general anecdotal feedback from Group B, indicated that they supported the messages in the presentation. Feedback from Group A was less clear, there were attendees who questioned aspects of the presentation which suggested some of the seminar information may have been in conflict with their own opinions on the topic.

Interestingly, 88% of those in Group B felt they had learnt new skills from the presentation compared with 75% in Group A. Both groups reported feeling very confident about using these new skills, although 100% of Group B felt confident compared with 75% in Group A. In Group B, an association was found between reported confidence and new skills. The majority of respondents who reported learning new skills also reported feeling confident using the skills [$\chi^2(1)= 7.11$, $p< 0.05$]. These results suggest a few things. Firstly, that a high percentage of attendees in both groups reported learning new skills and have confidence in carrying them out. Secondly, at closer examination, the findings support the notion that a higher percentage of respondents in Group B, who found the material more interesting and relevant, reported learning new skills and feeling confident about using them than in Group A. In essence, these results, supported by social theory, would predict that more of those people at the Group B meeting would have learnt more about the issue of wood-smoke and correct woodheater use techniques than those at the Group A meetings. If it had been possible, some form of follow-up and longer-term assessment of Group B and their heater operating behaviours would

have been interesting and allowed more certain conclusions to be made about the success levels of the information transfer.

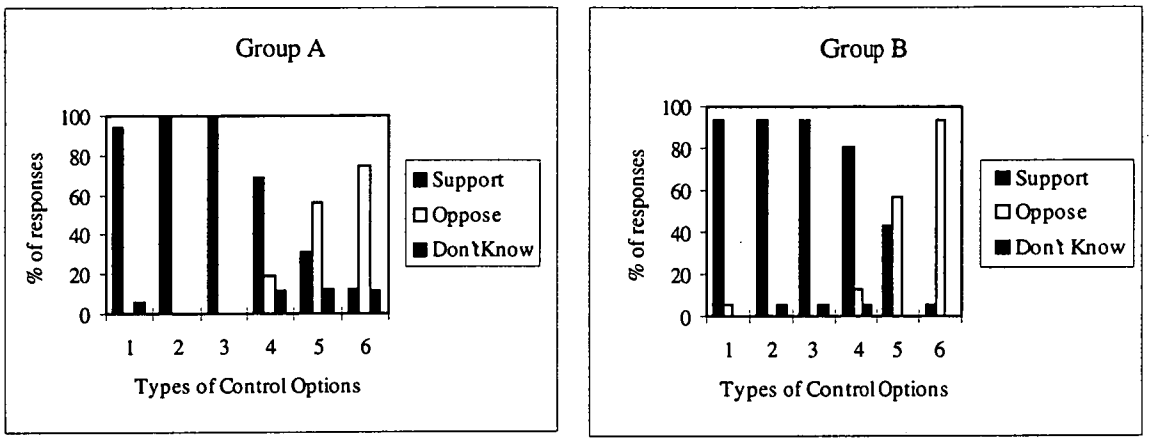
In relation to perceptions of wood-smoke pollution, 68% of Group B thought air quality was good or very good and 32% said they felt it was neither particularly good or bad. In Group A, 50% thought air quality was good or very good, 37% felt it was neither good or bad and 13% thought it was bad. These results suggest that Group A found the wood-smoke problem more salient. The two groups that make up Group A, are both in what would be defined as the inner Hobart region. In other words, they are more likely to experience wood-smoke pollution that gravitates down the hills and ridges surrounding Hobart towards the river valley. Group B are located in an outer Hobart area, half way up Mt. Wellington at Fern Tree (see Figure 3.3). In Fern Tree, woodheater use is high, but most of the smoke would move down the mountain and away from the region.

Firstly, this finding illustrates the regional nature of the wood-smoke problem and how it impacts on people's perception of the problem. Secondly, it seems at least plausible that this finding reflects a possible sense of denial by people that are responsible for a pollution problem. This could lead to a difference of perception of the magnitude of a problem caused by woodheaters between groups with a larger proportion of users (Group B) compared with a group containing a much smaller proportion of woodheater users (Group A).

When asked about the role that local community can play in improving air quality, the majority of Group B (63%) reported that the local community could play a somewhat important role in improving air quality, whereas 38% said they could play a very important role. In Group A, 50% thought the local community could play a very important role and 50% said a somewhat important role.

A range of hypothetical options that could be taken to control the problem of wood-smoke pollution were proposed in the survey. Figure 6.3 displays the percentages of survey responses of both groups to these possible options to control the problem of wood-smoke pollution. Both Groups A and B reported that spreading information about correct operation of woodheaters through communities was an important way to control the problem of wood-smoke. However, there were differences in the degrees to which they supported this idea. In Group A, 50% strongly supported this

notion and 44% mildly supported it while 6% did not know. In Group B, 81% strongly supported the idea and 13% mildly supported it, whilst 6% opposed the idea. These findings may reflect the strong sense of community that seemed present in Group B. The group's good representation of different age groups, their enthusiasm and the small, tight-knit community of which they are a part in Fern Tree, might have influenced the degree to which they supported word of mouth as a good method to spread the wood-smoke message.



Legend	
1. Word of mouth through communities	4. Local Government give warnings and infringement notices
2. Letter box information to smoky households	5. Ban on high pollution days
3. Expand community education	6. Total ban

Figure 6-3 Groups A and B responses to various control options for the wood-smoke problem.

The majority of respondents in both Groups A and B supported the idea of placing woodheater operation instructions in household letterboxes with smoky heaters. However, the degrees to which they supported it varied. In Group A, 69% strongly supported the idea and 31% mildly supported it. In Group B, 50% strongly supported it and 44% mildly supported the action, whilst 6% did not know. In Group B, an association between age and placing information in letterboxes was found. The middle and older age groups were more likely to strongly support the idea than younger respondents [χ^2 (3)= 7.31, $p< 0.05$]. In terms of expanding community education on the topic, in Group A 75% strongly supported the proposal and 25% mildly supported it. In Group B, 88% strongly supported it, 6% mildly

supported it and 6% did not know. Therefore, the approach of improving the wood-smoke problem through education was strongly supported by both groups.

There was reasonably strong support for a disincentive approach to the problem by local government giving out infringement or warning notices to homes with smoky woodheaters. In Group A, 38% strongly supported and 32% mildly supported the idea, 18% either mildly or strongly opposed the idea, whilst 12% did not know. In Group B, 32% strongly supported and 50% mildly supported the idea, 12% mildly opposed the idea and 6% did not know.

On whether or not action should be taken to ban woodheaters on days of predicted high pollution, only 19% of Group A strongly supported and 12% mildly supported the idea, whilst 56% either mildly or strongly opposed it. In Group B, again, 19% strongly supported it and 25% mildly supported it, whilst 56% mildly or strongly opposed the idea. In response to the option of banning woodheater use outright, in Group A, 6% strongly supported and 6% mildly supported the action, whilst 75% mildly or strongly opposed the idea. In Group B, 6% mildly supported it and 94% mildly or strongly opposed the option. In Group B, an association was found between perception of wood-smoke and banning woodheaters. The worse people thought the wood-smoke problem was, the more likely they were to say that heaters should be banned [χ^2 (12)= 20.1, $p<0.05$]. These findings on the issue of woodheater use suggest that both Group A and B felt similarly about voluntary curtailment of woodheater use on high pollution days. Just over half were opposed to the idea, but between 30-45% of the remaining survey population supported the possible option. Interestingly, greater support for this option came from Group B, who as mainly woodheater owners, the action would impact upon the most. However, Group B were more strongly opposed to banning woodheaters than Group A as would be expected.

7 SUMMARY AND CONCLUSIONS

7.1 SUMMARY

This thesis set out to ascertain whether environmental issues, such as the wood-smoke problem could be 'piggy-backed' on established neighbourhood groups and, if so, would such groups be effective disseminators of environmental information.

A literature review of the wood-smoke problem, and its potential effects on human health, revealed that wood-smoke is a significant contributor to urban air pollution in many Australian cities and regional areas. Some areas, for example, Hobart and Launceston, which have high woodheater ownership and, certain climatic and topographical conditions, are particularly prone to wood-smoke pollution. Sufficient evidence of the health impacts of wood-smoke and fine particles has been collected to recommend that efforts be made to minimise human exposure to wood-smoke. Together, the literature suggests that there is a good case for reducing wood-smoke production to improve air quality and human health.

In order to reduce wood-smoke this thesis focused on mechanisms for educating operators about better use of woodheaters. The thesis recognised the role of community involvement in environmental management, and governments' increasing support and acceptance of this approach to solving environmental problems. The literature review on neighbourhood and community group involvement in environmental education showed that neighbourhood groups have valuable communication networks and channels that benefit and assist in the dissemination of information.

A participatory case study approach was used in this thesis. In terms of achieving the research task, i.e. dissemination of information, the groups involved had moderate success; three out of eight neighbourhood groups adopting the wood-smoke issue and actively disseminating information. A number of common characteristics were identified among the three active groups. The groups had leaders who were good facilitators, had good organisational and interpersonal skills, were good listeners and were 'people persons'. They focused the group towards achievable short-term goals, were good motivators and helped the groups maintain strength and a clear vision of the groups' aims and purpose. The core members of

the groups showed the desire to be involved in the program and the groups had a strong 'sense of community'.

7.2 CONCLUSIONS

This thesis hypothesised that established voluntary neighbourhood groups could provide interpersonal channels and a range of other communication benefits that would enhance the persuasive power of the message on correct woodheater use. The findings of a literature review into the information-processing of new messages, and the interpersonal communication benefits and networks provided by neighbourhood groups, support the hypothesis.

The results from the case study were also generally consistent with the hypothesis. By reviewing the activities of the three more active groups out of the eight in the program, the advantages of using established neighbourhood groups are revealed. The three groups all had good leaders and members that were motivated and interested in taking on the wood-smoke issue.

Progress Association A had committee members who were aldermen in their local council and, consequently, these existing connections influenced how the group approached the task of disseminating the wood-smoke information. The outcomes of the group's educative efforts included: publishing information in the city council newsletter distributed to 21 000 homes; a public meeting; and a continuing commitment to pursue the wood-smoke education issue through council. The group's connections with the council eased the way to getting wood-smoke information published in the City Council newsletter. This result, together with the groups pledge to continue to lobby the council to educate the wider community about wood-smoke pollution, illustrated that established social connections and networks can benefit and influence the ways in which the neighbourhood groups use environmental education materials.

The educational actions of Neighbourhood Watch Group C included, organising a public meeting and conducting a door-knocking education campaign. The door-knocking campaign was independently initiated and conducted by the group. The group printed information about the wood-smoke issue and the door-knocking initiative in their Neighbourhood Watch newsletter. Zone leaders targeted homes with woodheater flues, initiated a general discussion about the topic with

householders, presented the information kit pamphlet and left a quiz to be picked up the following week. The quiz asked householders if the information in the pamphlet had changed any of their user practices, and if so how. On the back of the quiz, was an invitation to hear more about woodheaters at the public meeting.

This technique illustrates the advantage of 'piggy-backing' urban environmental issues such as the wood-smoke problem on established neighbourhood groups. The Neighbourhood Watch group, aim to create community spirit and cohesion in their neighbourhoods and ask residents to watch out for burglaries of their neighbour's home and property. One of the strategies the group use to achieve this aim, is face to face communication with householders in the neighbourhood. Neighbourhood Watch Group C were enthusiastic about diversifying and introducing the wood-smoke information to the neighbourhood in this personal manner. As the Neighbourhood Watch Group was established, it meant there was a source of motivated zone leaders who were prepared to visit their neighbours, door-knocking and spreading the information.

This technique is similar to that used by previous studies in the United States which assessed the role of 'block leaders' in increasing participation in recycling programs (Burn 1991; Hopper and Nielsen 1991; Nielsen and Ellington 1993). These studies tried to influence social norms through personal interactions among neighbours. The purpose of the 'block leaders' was to introduce people who might influence the opinion and behaviour of others through frequent personal interaction. All of these studies found that the 'block leader' intervention technique was successful in increasing participation in recycling programs (Burn 1991:625). The social principles that are thought to be responsible for the success of this approach were discussed in greater detail in Section 2.5.3.3.

In the case study, the Neighbourhood Watch Group zone leaders would have exerted similar social influences on householders they visited as the 'block leaders' did in the US studies. The personal contact approach was more likely to result in a commitment to participate in correct operational techniques. The householder's sense of commitment to try out the correct operational techniques would have been enhanced by the quiz about the pamphlet. Knowing the zone leader would return to collect the quiz the following week, would have also increased the householder's

sense of commitment to read the materials and attempt the correct operational techniques. Therefore, these results of the case study demonstrate the interpersonal communication benefits and potential persuasive power of utilising neighbourhood groups in transferring environmental education materials.

Five of the groups in the case study participated by publishing prepared materials in their community newsletters. Although these groups did not become as actively involved in the program as the other three, the benefits of giving educational materials to neighbourhood groups were highlighted. As the groups were established, it was possible to immediately publish wood-smoke information in the groups' newsletters which were delivered to (collectively) thousands of households. The newsletters also provided a medium to advertise public meetings for the groups that participated in this educational activity. These findings illustrate that the groups will publish material provided to them that is not directly related to their principal interest. It also demonstrates the benefits of using neighbourhood groups with established communication channels since materials can be immediately distributed to the wider community.

This thesis had a number of specific objectives that were met in order to conduct the case study. Firstly, it was necessary to conduct a broad literature review in order to design and organise the education program and develop appropriate educational materials. It is concluded that useful information on community education, woodheater use and health impacts of woodheaters was gathered. Restrictions, proposed by time and length of content, prevented the further exploration of the variety of topics this subject matter touched upon.

The second objective of this thesis was to prepare educational materials for the neighbourhood groups. The results of assessment of the educational materials showed that the produced pamphlet was very well presented and prepared. The majority of the expert panel reported that it was of high quality, apart from some possible additional content and reorganisation of the text. Therefore, the pamphlet would undergo little or no change if this were a longer study in which the materials were to be refined. Expressions of interest to use parts of the pamphlet from the Victorian EPA, New South Wales EPA, Adelaide Energy Information Centre and a

consultant working in the field of sustainable energy information emphasise the quality of the pamphlet.

In relation to the seminar booklet and overheads, the surveys conducted at the public meetings indicate that: the presentation package was understandable and interesting (100% of respondents); people found the material relevant (85%); most learnt new skills (82%); and most felt confident about using the new skills (88%). The production of the educational materials was limited both by time and finances. Given these restraints, the feedback from the groups indicated they were satisfied with the quality of both the seminar materials and the pamphlet.

In terms of using the educational materials, the groups were provided with a lot of autonomy and encouraged to initiate ideas within a supportive environment. This process was a 'catch-22' situation. It was important to record how the groups responded to the materials and the program with as little interference as possible, yet, the results suggest that many of the groups may not have been confident about transmitting the information in the kit and more direction may have been better. A more structured approach similar to that taken by Landcare, where group members are taught to use the information package so they feel confident about taking on the role of educators, might have been beneficial (Stadler 1991:4). Additionally, with more time it may have been possible to accommodate the less confident groups and those with lower 'level' leaders by providing greater support until they were more confident.

The production of a training and information video was planned for the case study but financial restraints limited its production. An audiovisual text was prepared but a suitable audiovisual service for production was not available and the video was ruled out. As mentioned in Section 3.5.1, O'Loughlin (1988) evaluated the effectiveness of a variety of educational materials for a bushwalking education campaign in Tasmania. The results of the market research indicated that video (80% of respondents) was considered by far the best method of putting across the message (O'Loughlin 1988:12). Research in communications and social psychology emphasises the importance of modelling and training of conservation behaviour and a video provides a suitable medium to achieve this (De Young 1993:488). Hence, in future studies, producing a training and information video

which could be given to neighbourhood groups would be a worthwhile venture. It could offer variety to presentations at public meetings and would be useful to conduct training sessions for group members.

The third and fourth objectives of this thesis were for the researcher to act as a link and support for the neighbourhood groups throughout the education program, record the groups' actions and responses, and review the short-term effectiveness of the program. Many aspects of these objectives have been addressed earlier in this chapter. The recording and monitoring of the groups' activities during the program has allowed the researcher to draw a number of conclusions about the short-term effectiveness of the program.

Although the case study in this thesis only showed moderate success, enough evidence has been collected to show that the 'piggy-backing' of environmental issues by established neighbourhood groups can work, particularly for groups with certain characteristics. These characteristics, such as strong leadership, good group dynamics and a 'sense of community' were discussed in Section 4.4 and in the summary of this chapter. The results suggest that targeting groups with these characteristics is critical to maximising the success an established neighbourhood group will have 'piggy-backing' an environmental education issue. The sample size of groups in this case study was small. Future studies would benefit from screening a greater sample size, and diversity, of neighbourhood groups in order to identify potentially successful groups in which greater time and energy could be invested.

This thesis has revealed that there are neighbourhood groups in the wider community which have excellent qualities, such as strong leaders and enthusiastic community-minded members, that are currently 'dying' or struggling to survive because of low membership and lack of wider community support. Perhaps by providing information to these groups on urban environmental issues such as the wood-smoke issue it may breathe life into these established organisations. If these groups occasionally carried and promoted other community-relevant topics, the greater diversity may help increase support and membership of the groups. When neighbourhood group leaders were interviewed for feedback on the education program, six out of the seven groups stated that the project was very worthwhile,

well prepared and presented. Four of neighbourhood group leaders expressed that they would like to be involved in other similar environmental education projects in the future, and three of the groups plan to continue distributing wood-smoke information in the winter of 1998. Hence, a double benefit could be obtained. Environmental education could be spread in an interpersonal manner and public interest and support for neighbourhood groups may increase.

As stated in Chapter 1, the wood-smoke issue is not an issue that warrants setting up a new community group to deal specifically with the problem. Hypothetically, there would be other similar environmental problems which local government may want to create greater community awareness about and disseminate education material. For example, a council may wish to educate the community about cleaning up a rivulet. Rather than taking the risk of trying to set up a new group that may or may not work (due to poor leadership or group dynamics), strong and successful groups could be targeted and provided with suitable educational materials and expert support from the council. This is not to say that government and council could abandon their responsibilities for environmental management, but that exploring avenues to communicate with the wider community and to support the development and growth of established neighbourhood groups would be worthwhile. All the groups in this case study responded favourably to the prospect of taking on a community-relevant and important environmental issue, such as wood-smoke pollution. Feedback from the neighbourhood group leaders, indicated that the majority thought the wood-smoke issue fitted their groups' charter and was very relevant for the groups and the community. Hence, resistance to this type of action would be unlikely to come from the neighbourhood groups.

As discussed in detail in Section 2.5.3.2, mass media education campaigns are thought to be important during information-processing to create awareness-knowledge, while interpersonal channels are relatively more important during the persuasion stage. The findings in this thesis suggest that these communication channels could be used in-conjunction with one another or in a sequence, progressing from mass media to interpersonal channels (Rogers 1995:195). Firstly, effort needs to be focused on refining mass media education campaigns. Factors that have been shown to increase the effectiveness of these programs include: increasing the specificity of the information to the target audience; emphasising

convenience and benefits of the behaviour; and increasing salience of the information (Dennis *et al.* 1990:1113).

For example, in the telephone survey, respondents highly supported the use of a segment on a television 'lifestyle' program to inform woodheater owners about correct operation techniques. Many reported that they ignored television advertisements but they would be more inclined to watch a segment on the topic within a television program. Having a segment on a program would provide the time to discuss the problem and allow visual modelling of the steps necessary to manage a woodheater correctly. Following-up, or in-conjunction with, this type of mass media campaign, education programs could be run at the local level, relying on interpersonal communication through existing social networks and neighbourhood groups with local credibility (Stern 1992:1228). These interpersonal channels could allow for an exchange of ideas, clarification and reinforcement of the new information, increasing the effectiveness of persuading individuals to change their behaviour (see Chapter 2) (Dennis *et al.* 1990:1113). This multiple-channel approach, and any other plans to work with neighbourhood groups, would need to be carefully planned in order for the groups to have sufficient time to become fully involved in a program.

As this case study was part of a Master of Environmental Management project, it ran between May 1997-November 1997. The groups were not introduced to the program and educational materials until June 1997. Since winter was the time to promote the information, the groups were asked to participate in the program over just three to four months. It appears this time-frame may have been too short to involve the 'average' voluntary neighbourhood community group because of members' other commitments. To maximise possible involvement it would be more appropriate to provide a longer time-frame so that groups could become more accustomed to the program and find a role they feel confident playing. The neighbourhood groups, like the Progress Association and Neighbourhood Watch groups, as a rule, have fairly low membership. Therefore, there is already pressure to prioritise the groups' primary tasks. Feedback from one of the neighbourhood group leaders identified 'time' as a factor that limited the groups further participation in the program. The leader reported that because the group was already committed to certain projects over the winter of 1997, it was difficult to

pick-up the wood-smoke issue. However, they were planning to distribute wood-smoke information during the winter of 1998.

The problem of wood-smoke in residential areas is a multi-faceted and complex issue. It is inherently difficult to get the message of using woodheaters correctly to the wider community. The message is a preventative one and it really is only targeted at about half the population in Tasmania who actually use woodheaters. Although wood-smoke emissions from woodheaters have the most significant direct impact on air quality from the residential sector, the general public remain relatively ignorant about the issue, and lethargic about improving the problem. It remains a case of 'it is someone else's heater producing the smoke'. Understanding the implications of social and psychological principles of the adoption of new information and behaviour, and incorporating these into the design of large scale education campaigns, will be necessary to improve the effectiveness of current environmental education campaigns.

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APPENDIX 1

Telephone Contact Script

Hello, my name is Jennie McDonnell and I am a Master's student from the Centre for Environmental Studies at the University of Tasmania. As part of my degree, I will be conducting a research project to determine if volunteer community groups are an effective means of disseminating information about correct woodheater use to the general public. I am ringing to inquire whether your community group may be one that would want to be involved in this project.

Environmental education can be disseminated in a number of ways. I guess the most effective way is probably through television, or radio, however that can be costly. Through this project, I want to see if voluntary community groups are effective at transferring information to their own communities, through meetings, newsletters, whatever you normally do.

In Tasmania, around 60% of people use wood-heaters and wood-smoke has become an air pollution problem. The problem is that wood-smoke may have adverse health impacts so we want to encourage people to produce less smoke. Many people do not realise that it is possible to manage their fire in such a way that it will clean burn with much less smoke. It involves following some simple instructions.

I have prepared information kits which have background information on wood combustion and health risks of wood-smoke, overhead projection sheets, slides, suggestions for community activities, an information poster and possibly a video.

Throughout this project, I would like to work closely with community groups encouraging them to participate and spread the message. I would like to make a time to come and show the information kit to those involved in your local community group. From there, I would like to leave the kit with you and ask that over the next couple of months, meetings would be organised by your group in order to show the general public in your area the kit and therefore, disseminate the important message about how to use woodheaters correctly to your local community. As part of the process of assessing the effectiveness of this community group participation approach to educating the public about correct woodheater use I would ask you to report back on how many people in the community you have communicated with and what their response had been. I will provide you with forms to distribute to those that attend any meetings conducted to see the kit in order to record this information for me. I would also like to have a focus group meeting later in the year so that those community groups that did participate will have the opportunity to comment on the effectiveness of the kit. This project

commenced in February 1997. The community education dissemination to the community groups will take place in May and June 1997, the assessment in August/September, and the thesis will be completed early in 1998.

Thank you for your time and interest and I will write to you shortly.

Jennie McDonnell

APPENDIX 2

Centre for Environmental Studies
University of Tasmania

GPO Box 252-78, HOBART,
Tasmania 7001, AUSTRALIA
Telephone (03) 6220 7455
Facsimile (03) 6220 2989
Contact Jennie McDonnell

Wood-Smoke Reduction through Community Groups

3 April 1997

Dear Mr. Gorman,

In reference to our phone call regarding the wood-smoke reduction through community education project that I am conducting, I am writing to provide you with more detailed information.

My name is Jennie McDonnell and I am in the process of completing a Master of Environmental Management at the Centre for Environmental Studies at the University of Tasmania. As the thesis component of my degree I will be conducting a research project to determine if volunteer community groups are an effective means of disseminating information about correct woodheater use to the general public. Additionally, this project aims to improve urban air quality in Tasmania through reduced emissions of wood-smoke achieved by improving operation of woodheaters.

Environmental education can be disseminated in a number of ways for example, through television, radio and pamphlets. My project aims to examine if volunteer neighbourhood groups, such as West Launceston Neighbourhood Watch, are an effective means of transferring environmental education information to the local community.

I think that the issue of wood-smoke pollution from domestic heating is a significant one in Tasmania because of the climate and the fact that 55-60% of all households use woodheaters. Wood-smoke from domestic heating is a significant component of winter particulate matter in the air pollution seen in all larger towns and cities in southern Australia. Overseas research in the last decade has highlighted the possible adverse health impacts of fine particulates. Epidemiological studies suggest that

inhalation of wood-smoke increases the severity and incidence of respiratory diseases, particularly in children and the elderly. Yet, wood-smoke is a component of air pollution people can influence with little inconvenience to their lifestyle. It is possible by following some simple instructions to manage most woodheater fires in such a way that clean burning with no smoke occurs. Unfortunately, many people don't know how to achieve this.

The project will involve the collection of information both nationally and internationally on the best operating procedures for woodheaters. Using this material I will prepare information kits about correct woodheater use which will be suited for use by community groups. These kits will contain a mix of materials and information which have background information on wood combustion and health risks of wood-smoke, overhead projection sheets, slides, suggestions for community activities, an information poster and possibly a video.

Throughout this project I would like to work closely with community groups encouraging them to participate and spread the message. I would like to make a time to come and show the information kit to the committee members of the Friends of the Earth group. As the aim of the project is: to determine if whether provided with a user friendly information kit, local community groups are an effective means of disseminating environmental information to their local community. I would like to leave the kit with you and ask that over the next couple of months, public meetings would be organised by an enthusiastic committee member/s of the West Launceston Neighbourhood Watch group. At these public meetings the committee member/s would use the kit that I have provided to disseminate the important message about how to use woodheaters correctly to your local community.

To assess the effectiveness of this community group approach to educating the public about correct woodheater use, I would like you to record how many people in the community you contacted and what their response was to the kit. I will provide you with evaluation forms to distribute at the public meetings conducted to record this information. I would also like to attend an additional meeting of your committee later in the year so that they can have the opportunity to comment on the effectiveness of the kit.

This project commenced in February/March 1997. I propose to visit your community group committee and demonstrate the kit sometime in May or early June. I would then hope the community education meetings run by a committee member/s disseminating the information to the local community will take place in June and

July. I would like to attend a committee meeting in August/ September to discuss the kit, and the project will be completed in early 1998.

Thank you very much for your time and interest in reading this proposal and if you have any queries please contact me. I hope to hear from you soon.

Yours Sincerely

Jennie McDonnell

APPENDIX 3

Interview guide for group leaders questions on wood-smoke community education program.

General introduction:

1. Do you think your group enjoyed participating in the program during the year?

2. Did you feel it was worthwhile and that your group members enjoyed being involved?

3. What do you think was gained by your group becoming involved? ie. the group learnt something? the local community would have learnt something?

Service issues:

1. Did you find the techniques (ie phone and letter) for initially contacting you were appropriate?

2. Did you feel you had sufficient understanding of what the student, Jennie hoped would be your role in the program?

3. Did you find the group discussion when John and Jennie came to talk to you interesting? Can you suggests ways that we could have got more out of that discussion?

4. Overall did the materials and the program meet your expectations?

Participation

1. How do you feel about your groups participation in the program?

2. Was it to your expectations?

3. Do you think your group would you have liked to participated more/less? How could this have occurred? (ie more time, more help.)

4. Did you feel you had sufficient or too much autonomy in the program?

5. Would you have appreciated more guidance and structure in ideas to distribute info?

6. Did you feel comfortable with using the materials? Would you have benefited from further introduction to the topic and how to use the materials by Jennie?

7. In what ways could the program have been improved?

8. How would the involvement of the group be increased? Can you suggest ways to do this?

9. Any further suggestions or comments?

Content Issues:

1. Was the topic covered in the program relevant and interesting to you and your group?

2. Do you think the information was presented in the best way? Was it too complex / easy?

3. Do you think it would have been better to leave some things out or were there things not covered in sufficient depth for you?

4. In terms of the materials (the pamphlet and the seminar materials) do you think they created interest and attracted people's attention?

5. Was there anything confusing or offensive in the materials?

6. Did you think the information was convincing and likely to persuade woodheater users to operate their woodheaters correctly?

Interpersonal issues.

1. Did you feel comfortable with the role that was asked of you by the program (that's in terms of the groups trying to help disseminate information about wood-smoke)?

2. Did you feel comfortable with Jennie as the facilitator?

3. Did you feel listened to and understood?

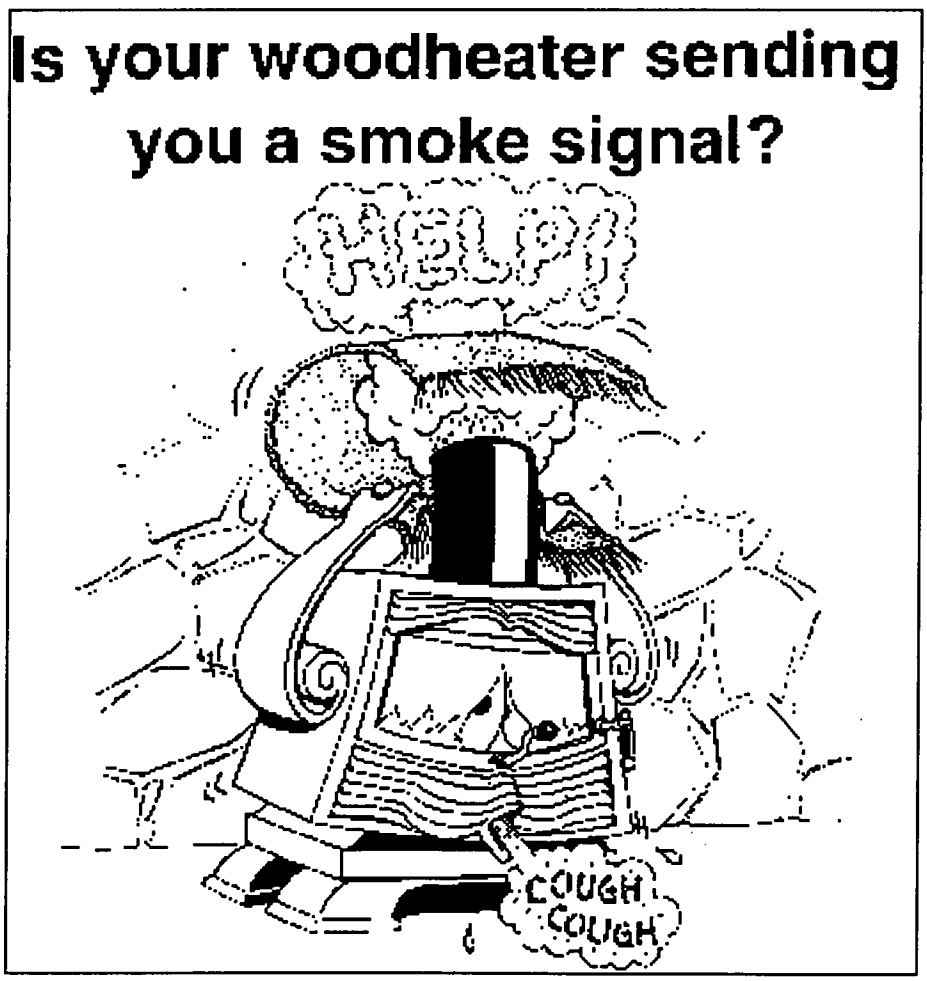
4. Was she interested, approachable and sincere?

5. Any further comments?

APPENDIX 5

Some examples of text and accompanying overheads from the seminar materials.

The Effects of Domestic Wood-smoke from Woodheaters and a Guide to Correct Woodheater Operation Information Kit.



Prepared by Jen McDonnell

June 1997

Introduction

The following booklet of information has been written to be used in conjunction with overheads so that the reader can present this information in a seminar. This information package has been designed to provide community groups with a substantial amount of information. However, you can choose to make the presentation as long as you like by omitting sections. For example, you may prefer not to talk about "Wood as an energy source". Of course, it is up to you how you wish to use the information. The full kit takes about an hour to present. A suggested short version (30 minutes) would make use of overheads 1-3, 8-10, 12, 15-20, and 23. From page 4 onwards the text in this booklet will work in conjunction with the overhead sheets in the form of a seminar. Throughout the text there are highlighted notes to tell you when you need to change overheads, and they will look like this :

Insert Overhead... (Then the title of the overhead.)

Insert Overhead 13. A Guide to Using Your Woodheater Correctly.

- The first step towards running your woodheater efficiently and correctly is to consider how well your home is insulated.

- By improving the insulation in your home you can reduce wood-smoke production because you will be decreasing the amount of heating needed to keep you home at a comfortable temperature. A well insulated house may not need extra heating in summer, or overnight burning in winter to stay comfortably warm and will save your money in running costs for your woodheater.

- Having insulation in your roof and good curtains on your windows are just starting points. Simple things like shutting doors and having draught stoppers at the base of doorframes are also important. It may even be appropriate to have insulation in your walls and double-glazing on windows.

- If you are installing a woodheater be sure to get the right size for your home. You don't need a heater larger than recommended because it will end up being operated at a low air setting resulting in poor efficiency and air pollution.

- It should be professionally installed and one that meets the Australian Standard - AS 4013. Heaters that comply with the Standard emit a maximum of 5.5g/kg of wood-smoke for a slow burn rate, whilst heaters that don't comply (worst case) have been measured as producing as much as 50g/kg of wood-smoke on slow burn rate and double that if incorrectly operated. Some heaters have been designed to emit as little as 1g/kg.

- Receiving advice on the best location for heat dispersion is also important. Woodheaters set up circulating air movements in a room. So, there will be good and bad locations for heater placement. Many woodheaters if installed in the appropriate position can heat several rooms or even an entire house if it is draught-free and insulated.

Insert Overhead 14. Buying and Storing Wood

- It is best to buy your wood supply in summer in preparation for winter. Usually it is better quality and cheaper.

- Ensure the wood has been dried for at least 12 months and that its moisture content is between 12-20%. Wet wood leads to a cooler fire, which produces more smoke and forms more creosote in your flue.

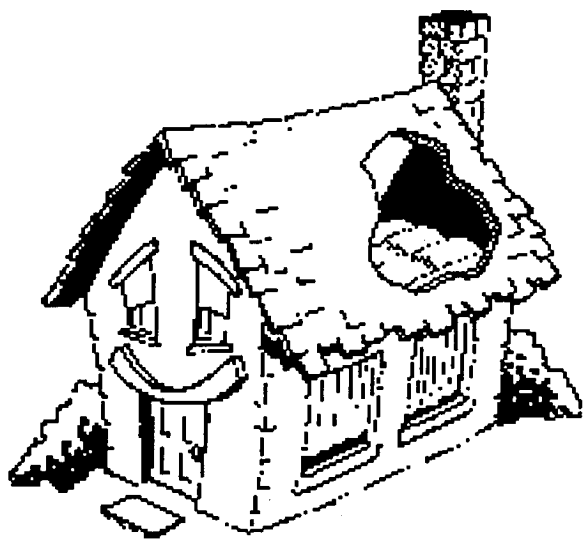
- A dry, ventilated shelter to store your wood is important. When you arrange the wood for storage, stack it so air can flow through it, this will remove any excess moisture in the wood.

- If you don't have a woodshed, try placing some bricks or rocks on the ground to act as a floor (which stops insect infestation and helps drying) and stack the wood on top. Then tie down some iron roofing sheets over the stack. Try not to use plastic sheeting or a tarpaulin because it does not encourage ventilation.

- If you like keeping your wood under the verandah, be aware that wood stacked against the house wall could be forming a tunnel of entry for ants or other insects into you home.

A Guide to Using Your Woodheater Correctly.

- In order for your woodheater to run efficiently it is best to have a home that has:

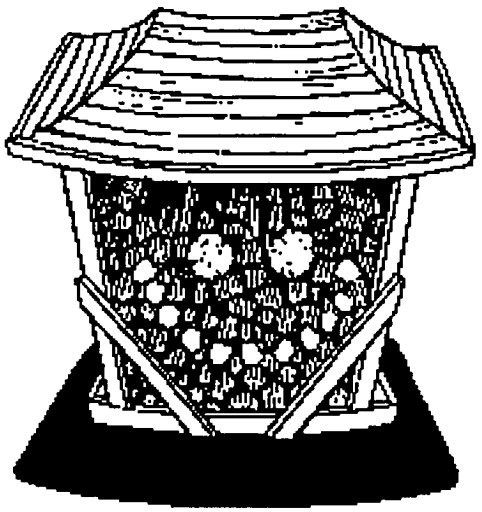


• insulation in the roof and
• good curtains with pelmets.

- If installing a woodheater be sure to get the recommended size for your home that meets Australian Emission Standards AS-4013.

- Get it professionally installed in the best location for heat dispersion in the house.

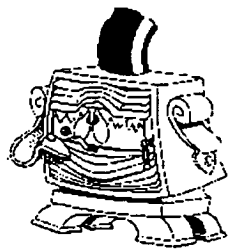
Buying and Storing Your Wood.



- Buy your wood in summer, it is usually better quality and cheaper.
- Ensure it is air dried for at least 12 months.
- Ensure its moisture content is between 12-20% because wet wood means a cooler, smokier fire and creosote build up in your flue.
- Try to store your wood in a well ventilated, dry woodshed.
- Stack the wood so it allows air movement between the logs to encourage further drying of the wood.

APPENDIX 6

Wood-smoke Information Survey



Hello, my name is Jennie McDonnell. I am from the University of Tasmania. I am conducting a brief survey about the issue of wood-smoke and air pollution. Would you be prepared to spend a few minutes answering some questions?

Section 1. Background information

1.1 What is the main type of heating used in your household?

Electric ❒

If 1, is it a heat pump or other?.....

Wood ❒

Gas ❒

Other ❒

No Heat ❒

(If wood, go to 1.1.1)

1.1.1 What sort of appliance do you have?

Open fire ❒

Free standing woodheater ❒

Woodheater in a fireplace ❒

Other ❒

Section 2. Perception of wood-smoke pollution

2.1 How good do you think Hobart's air quality is in winter?

Very Good ❒

Good ❒

Neither Good or Bad ❒

Bad ❒

Very Bad ❒

(If response is bad, go to 2.1.1)

2.1.1 What do you think are the main causes of air pollution?

.....

...

2.2 Do you think that wood-smoke seems to be worse or better in the last 12 months?

Worse ❐
Better ❐
Don't Know ❐

2.3 Do you think your local community can play an important role in improving Hobart's air quality?

Very Important ❐
Somewhat Important ❐
Not Very Important ❐
Not Important at all ❐

2.4 Please read these hypothetical actions of how we could control the problem of wood-smoke. For each one please tick the appropriate box to indicate how you support the idea.

	Support Strongly	Support Mildly	Oppose Mildly	Oppose Strongly	Don't Know
1. Word of mouth through communities	❑	❑	❑	❑	❑
2. Drop information pamphlets into the letter-boxes of households with smoky heaters	❑	❑	❑	❑	❑
3. Expand community education campaigns	❑	❑	❑	❑	❑
4. Local Government give out infringement notices for smoky heaters	❑	❑	❑	❑	❑
5. Ban woodheaters on predicted high pollution days	❑	❑	❑	❑	❑
6. Totally ban the use of woodheaters	❑	❑	❑	❑	❑

Section 3. Wood-smoke Information Seminar

In regards to this evenings presentation:

3.1 Did you find this evenings presentation interesting and enjoyable?

Very Interesting and Enjoyable ❐
Quite Interesting and Enjoyable ❐
Not at all Interesting and Enjoyable ❐
Boring and Unenjoyable ❐
Don't Know ❐

3.2 Did you feel the information presented was relevant to you?

High Relevance ❐
Medium Relevance ❐
Low Relevance ❐
Not at all Relevant ❐
Don't Know ❐

3.2.1 If you felt it was not relevant, why?

.....

3.3 Did you find the information was easy to understand?

Yes ❐
No ❐
Don't Know ❐

3.4 Prior to tonight's seminar, did you feel you were already well informed on the topic of air pollution caused by wood-smoke and correct operation techniques of woodheaters?

Yes ❐
No ❐
Don't Know ❐
Other.....

3.5 Did you learn any new information and skills in operating woodheaters from the tonight's presentation?

Yes ❐
No ❐
Don't Know ❐

If so, what in particular.....
.....

(If no got to question 3.7.)

3.6 Do you feel confident about using the new information and skills when operating a woodheater?

Yes ❐
No ❐
Don't Know ❐

If no, why.....

3.7 Finally, have you any comments you would like to make about tonight's presentation or the topic in general?

.....

...

.....

...

Section 5. Demographic information

Finally, I have just a one question about yourself which will be useful for statistical purposes only.

5.1 Which of these age groups are you in?

18-29	❐
30-39	❐
40-49	❐
50-59	❐
60 or Over	❐

5.2 Please tick Male ❐

Female ❐

Thank you very much for your assistance.

APPENDIX 8

Interview
Interview Number
Date of Interview
Time of Interview
Telephone Number Called

Introduction
Hello, my name is..... I am from the University of Tasmania. We are conducting a survey in the Clarence municipality about the issue of home heating and air pollution. Would you be prepared to spend a few minutes answering some questions?

Section 1. Background information

1.1 What is the main type of heating used in your household?

Electric ❒
If 1, is it a heat pump or other?.....
Wood ❒
Gas ❒
Other ❒
No Heat ❒

(If wood, go to 1.1.1)

1.1.1 What sort of appliance do you have?

Open fire ❒
Free standing woodheater ❒
Woodheater in a fireplace ❒
Other ❒

Section 2. Perception of wood-smoke pollution

2.1 How good do you think Hobart's air quality is in winter?

Very Good ❒
Good ❒
Neither Good or Bad ❒
Bad ❒
Very Bad ❒

(If response is bad, go to 2.1.1)

2.1.1 What do you think are the main causes of air pollution?

.....

.....

2.2 Do you think that wood-smoke seems to be worse or better in the last 12 months?

Worse ❑

Better ❑

Don't Know ❑

2.3 Do you think your local community can play an important role in improving Hobart's air quality?

Very Important ❑

Somewhat Important ❑

Not Very Important ❑

Not Important at all ❑

2.4 I am going to read some hypothetical actions of how we could control the problem of wood-smoke. As I do, for each one can you say the degree to which you support the idea. (Support-S, M: Oppose- S,M. Don't Know)

	Support Strongly	**Support Mildly**	**Oppose Mildly**	**Oppose Strongly**	**Don't Know**
1. Expand community education campaigns	❑	❑	❑	❑	❑
2. Drop information pamphlets into the letter-boxes of households with smoky heaters	❑	❑	❑	❑	❑
3. Word of mouth through communities about correct operation	❑	❑	❑	❑	❑
4. Local Government give out infringement notices for smoky heaters	❑	❑	❑	❑	❑
5. Ban woodheaters on predicted high pollution days	❑	❑	❑	❑	❑
6. Totally ban the use of woodheaters	❑	❑	❑	❑	❑

*** (Please note: Section 3 and 4 is for woodheater owners only, if not woodheater owner go to Section 5) ***

Section 3. Wood-smoke education material

3.1 Did you receive a newsletter in the first week of September 1997 entitled the "Clarence City Council News"?

Yes ☐
No ☐
Don't Know ☐

(If no, go to 3.7)

3.2 Did you notice the article entitled "Is your woodheater sending you a smoke signal?" on page four of the newsletter?

Yes ☐
No ☐
Don't Know ☐

(If no, go to 3.7)

3.3 Did you read this article?

Yes ☐
No ☐
Don't Know ☐

(If no, go to 3.7)

3.4 Do you recall the main message or any advice from this article?

If so what.....

3.5 Do you think any of this advice would help you in using your woodheater better?

Yes ☐
No ☐
Don't Know ☐

3.6 Are you planning to contact the Clarence City Council for a comprehensive pamphlet on the topic?

Yes ☐
No ☐
Don't Know ☐

If no, why.....
.....

3.7 Apart from the article in the Clarence City Council newsletter, have you seen or heard any educational material on correct operation of woodheaters in the last 12 months?

Television Ads ❐

Newspaper Articles ❐

Community (i.e. Progress Groups, Neighbourhood Watch) Newsletters ❐

Government Info ❐

Other ❐

3.8 I am going to read out some ways to spread information about correct operation of woodheaters. As I do, could you please say the degree to which you think it would be effective.

	Very effective	Mildly Effective	Ineffective	D. Know
Through community groups	❐	❐	❐	❐
Television Ads	❐	❐	❐	❐
Newspaper/newsletter article	❐	❐	❐	❐
Television Programs i.e. like Burke's Backyard	❐	❐	❐	❐
Government Information	❐	❐	❐	❐

Reminder: Section 4 is only to be completed by woodheater owners

Section 4. Woodheater owners current operation techniques

As a woodheater owner I just want to ask a few additional questions.

4.1 Who usually operates your woodheater?

.....

..

4.2 Do you ever check outside on the smoke levels coming from your flue or chimney?

Yes Frequently ❐

Yes Occasionally ❐

No Never ❐

Don't Know ❐

4.3 Have you taken action to decrease the amount of smoke your heater is producing?

Yes Frequently ❐
Yes Occasionally ❐
No Never ❐
Don't Know ❐

4.4 Do you realise the arrangement of logs in the fire can influence the amount of smoke produced?

Yes ❐
No ❐
Don't Know ❐

4.5 Do you try to ensure there is always a good flame in the heater?

Yes ❐
No ❐
Don't Know ❐

4.6 When you refuel your heater do you run it on high for 15-20 mins before reducing the air supply?

Yes ❐
No ❐
Don't Know ❐

4.7 Do you burn your woodheater overnight and refuel it in the morning?

Yes ❐
No ❐
Don't Know ❐

(If yes, go to 4.7.1)

4.7.1 In order to get your heater to burn overnight do you have to turn the air to low immediately after refuelling?

Yes ❐
No ❐
Don't Know ❐

4.8 Are you thinking of changing to another form of heating?

If so what?.....

4.9 We are particularly interested in education about correct use of woodheaters. Do you have any general comments on this issue you would like to make?

.....

.....

.....

Section 5. Demographic information

Finally, I have just a one question about yourself which will be useful for statistical purposes only.

5.1 Which of these age groups are you in?

18-29 ❐

30-39 ❐

40-49 ❐

50-59 ❐

60 or Over ❐

(5.2 can be filled in by interviewer)

5.2 Male ❐

Female ❐

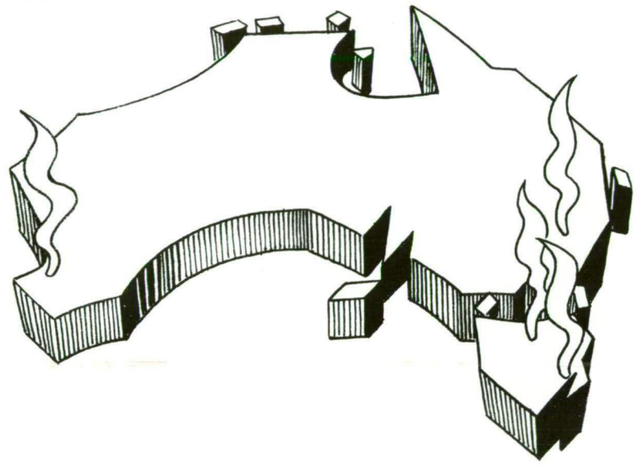
Thankyou very much for your assistance. Just in case you missed it, my name is ..... and I am from the University of Tasmania.

HOT SPOTS for WOOD-SMOKE

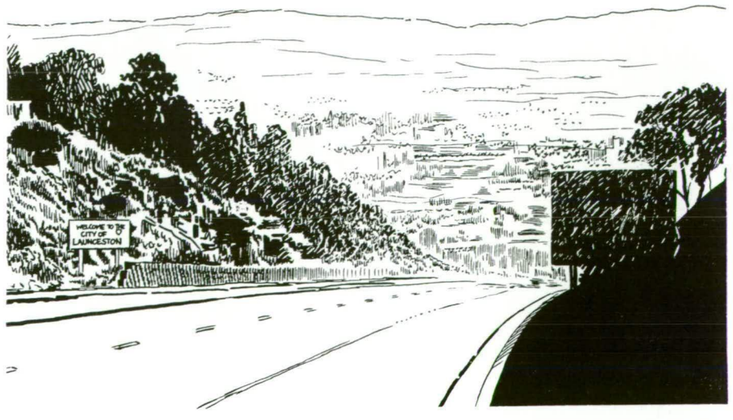
Wood is an important energy source in Australia. About 25% of households use it for heating, cooking or water heating. Over the last 20 years, there has been a large increase in the use of woodheaters. This has been most significant in Tasmania :

- **around 60% of households use wood as a primary heating source.**

Domestic heating with wood is relatively cheap and renewable but is not without its problems. The main problem is the production of wood-smoke pollution. Hobart, Launceston, Canberra and Perth all have poor air quality during winter due to wood-smoke.



Launceston has a significant wood-smoke problem because of its topography and the climate characteristics of the region. Approximately 60% of households in Launceston use woodheaters for domestic heating. Both of these factors mean that the city is prone to air pollution in winter. By people operating their woodheaters correctly a significant decrease in wood-smoke pollution would occur.

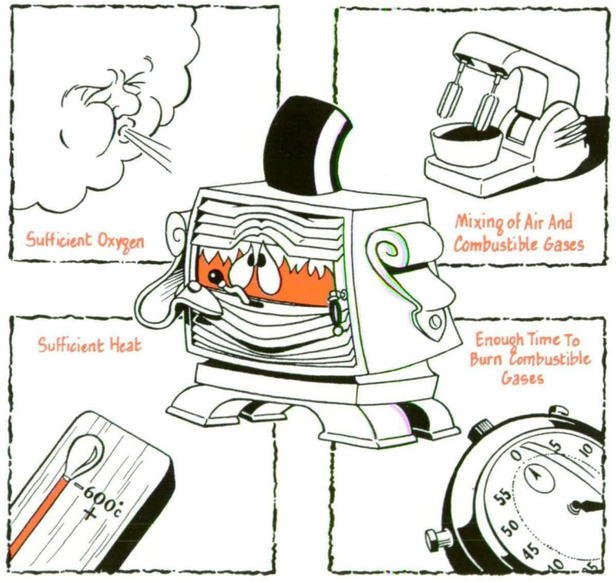


WHERE DOES WOOD-SMOKE COME FROM?

An understanding of the basic processes of combustion is important in order to learn to manage your woodheater correctly. When wood burns a number of processes are occurring simultaneously:

- **the wood is dried**
- **volatile gases, such as hydrogen, methane, complex tars and oils released from the wood are burnt and**
- **charcoal is produced.**

The gases released ignite at very high temperatures and cause the flames. To keep these gases burning vigorously, high temperatures and sufficient oxygen are needed. When your fire is starved of oxygen incomplete combustion occurs and the majority of gases and tars are not burnt but released into the air. As they cool they condense into tiny droplets of oils or tars which are known as wood-smoke particulates. Combustion requires a number of conditions to occur :



Therefore, to create a happy, hot, turbulent fire that minimises pollution, you should aim to maintain the conditions for maximum combustion.

COMMUNITY PARTICIPATION

Landcare, Waterwatch, Coastcare and the general public participation in recycling are all examples of communities becoming more responsible for environmental management. Using your woodheater correctly is a simple way of significantly improving your local environment. It will also improve the health of your family and the community you live in.

UNIVERSITY OF TASMANIA

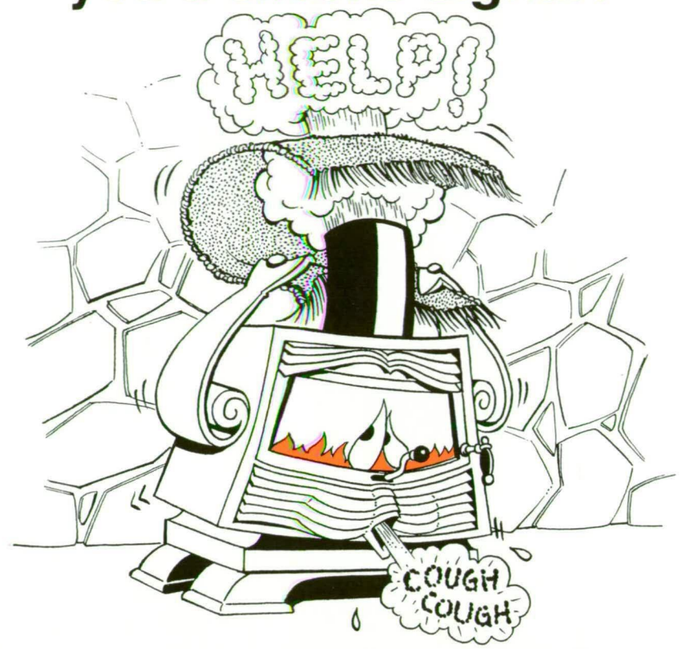
Editors: Jen McDonnell & John Todd

Graphics & Illustrations by David Heinrich

AUSTRALIAN WOOD HEATING ASSOCIATION INC.

This information pamphlet was produced as part of a Master of Environmental Management.

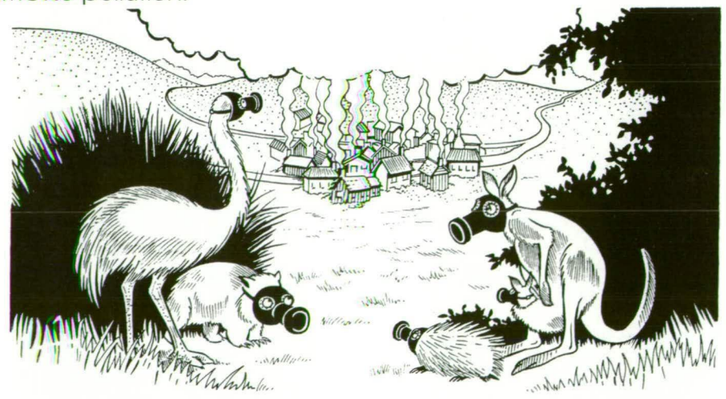
Is your woodheater sending you a smoke signal?



Your guide to correct woodheater use.

WOOD-SMOKE and AIR POLLUTION

Wood-smoke in suburban areas has been gradually increasing over the last 15 years, to a point where it is now a significant cause of decreased air quality. Domestic woodheaters are a large contributor to the overall concentration levels of wood-smoke pollution.



The good news is that by using your woodheater correctly you can:

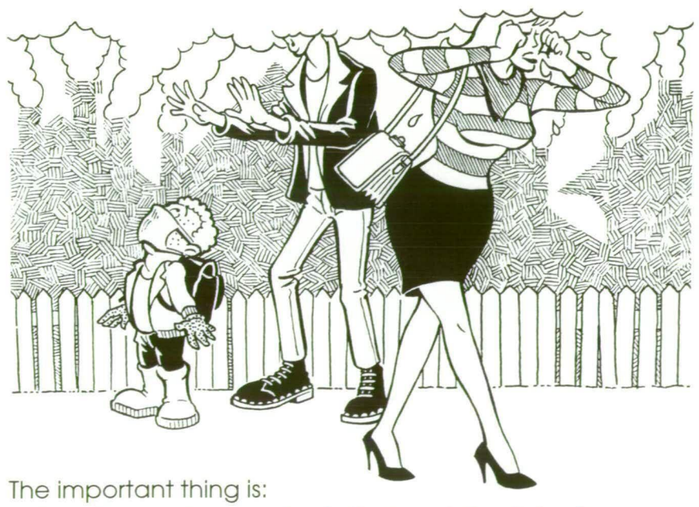
- **minimise smoke emissions and thereby reduce air pollution**
- **reduce running costs by improved heater performance and**
- **reduce the need for flue cleaning and the risk of chimney fires from creosote (tar and soot) build up.**

WOOD-SMOKE and HEALTH RISKS

Woodheater emissions are composed of :

- **oxygen, nitrogen, carbon dioxide, water vapour and**
- **a number of pollutants from incomplete combustion.**

The pollutants produced by incomplete combustion which are of concern to public health are small particulates and polycyclic organic materials (POMs). The small particulates are less than 10 micrometres, which is small enough to be inhaled and lodge in the lungs. Some evidence suggests that hign concentrations of particulates may exacerbate respiratory infections in children and the elderly and may aggravate asthma. Polycyclic organic materials, such as benzo-a-pyrene, consist of suspected or known organic carcinogens which may contribute to health problems in the longer term.



The important thing is:

- **to minimise these potentially harmful pollutants.**

When you use your woodheater correctly the majority of these pollutants are burnt and not released into the air and into our bodies.

A GUIDE FOR CORRECT WOODHEATER USE.

This guide for correct woodheater use is a generalised model. All woodheaters have their own eccentricites as to how they best burn. Therefore, you should take time to learn how your heater runs best using these tips as a guide.

BEFORE YOU START

In order for your woodheater to run efficiently it is best to have a home that has :

- **insulation and**
- **good curtains with pelmets.**

If installing a woodheater be sure to get the recommended size for your home that meets Australian Emission Standards. Get it professionally installed in the best location for operation and heat dispersion for the house.

CHECKING THE SMOKE

Check your flue for visible smoke occasionally. Except for the 10-15 minutes after lighting and refuelling, there should only be faint smoke from older heaters (pre-1994) and just a heat haze from newer heaters (post-1994). A plume of blue or grey smoke indicates that you have a problem.

- **Try adjusting the fuel load and air settings to minimise smoke.**

CHECKING YOUR FIRE

You should aim to burn a bright, hot and turbulent fire. Gases vapourising out of the wood should rise and enter a zone of extreme heat where they burn. So, when your woodheater is being run efficiently, the wood should be flaming until only charcoal remains. If there are no flames something is wrong. If your fire burns down very low:

- **add kindling and newspaper and create a vigorous fire run on full air supply for 15- 20 minutes.**

LOADING & LIGHTING YOUR FIRE

Loading

When loading wood for a fire, it is important to leave sufficient space for the movement of air and gases. So, when you load or refuell your fire remember to:

- **leave about 25mm between the logs for air and gas movement**
- **if there is no grate, place the log ends so they face the door, this allows air to get to the base of the fire**
- **leave a layer of ash for a better performing fire**
- **don't overfill your woodheater.**

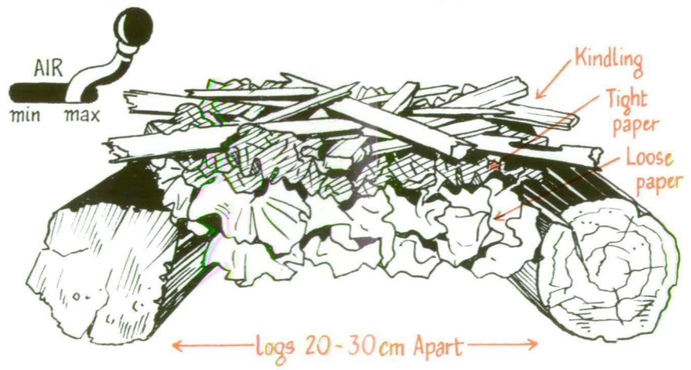
Lighting your fire

Everyone has their own unique method for setting and starting a fire. The following is a technique for starting a successful fire.

Start by:

1. **opening the air vents to maximise air supply**
2. **put a dry log on either side of the firebox leaving 20 to 30 cm in between**
3. **place one or two loosely crumpled pages of newspaper on the wood**
4. **add a further 4 or 5 pages of tightly screwed paper on top, followed by dry kindling and small dry logs**
5. **light your fire**
6. **burn the fire on high rate for 15-20 minutes before adding more logs.**

Some heaters are harder to light because the flue needs warming. Try burning some newspaper on top of the set fire to warm the flue. By following these simple techniques, you will create a hot, turbulent fire that will burn off released gases, maximising combustion and minimising pollution.

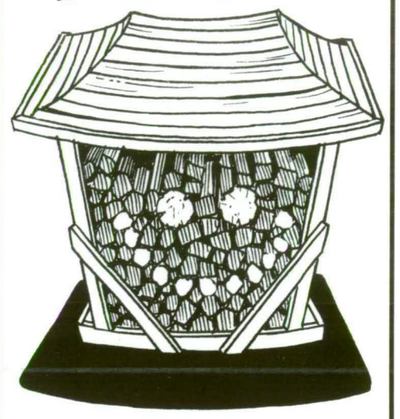


BUYING AND STORING WOOD

Buy your wood in summer and ensure it has been air-dried for at least 12 months and it's moisture content is between 12-20%. Wet wood will lead to a cooler, smoky fire and greater creosote build up in your flue.

Store your wood :

- **Dry, ventilated store room.**



OVERNIGHT BURNING

When woodheaters are loaded for overnight burning and then the oxygen supply is turned to low, the fire tends to smolder. The smoldering wood can not ignite the gases it is releasing because there is insufficient heat and oxygen for combustion. Consequently, the gases are released into the atmosphere.

If you overnight burn:

- **when you load the heater, burn the wood on high rate (full air supply) for 15-20 minutes before turning it down.**

By doing this, the gases are burnt off before the oxygen supply is limited for slow burn, and the amount of smoke produced overnight is greatly reduced.

Newer model woodheaters can accommodate overnight burning if they are managed in this way. Ideally, older heaters should not be turned down for overnight burning and an alternative heating source should be used in the mornings.

Mount Stuart News

November 1997

Editors: David Metcalfe, Eric Pinkard
Postal Address : PO Box 116, North Hobart 7002

MOUNT STUART COMMUNITY SERVICE ASSOCIATION INC

Office Bearers elected at the AGM in March were :

President	Desley Parkinson
Secretary	David Metcalfe
Treasurer	Eric Pinkard
Committee	Linley Grant, Lynn Cave, Kath Venn, Jenny Keyes, Heather Henderson, Peter Earles, Gil Chalk
Caretaker	Keith White
Booking Office	Lois Allison

MOUNT STUART PROGRESS ASSOCIATION

Office Bearers elected at the AGM in March were

President	Desley Parkinson
Secretary	David Metcalfe
Treasurer	Eric Pinkard
Committee	Linley Grant, Lynn Cave, Kath Venn, Jenny Keyes, Heather Henderson, Peter Earles, Gil Chalk, Keith White, Lois Allison

The Progress Association has just incorporated and is now the Mount Stuart Progress Association Inc. Incorporation is regarded as an advisable procedure for any club or association, in order to limit the extent of members' financial liability in the event of the club or association being sued. In our case, an additional reason results from changes to the regulations governing appeals on planning issues, where in some cases unincorporated associations are ineligible to lodge appeals.

IS YOUR WOODHEATER SENDING YOU SMOKE SIGNALS?

If you own a woodheater, after the heater has been going for at least 30 minutes, walk outside and look up at your flue. If there is a plume of grey smoke, you have a problem. Wood smoke is, in fact, wasted fuel. By correctly operating your woodheater you can at least halve the amount of smoke produced.

There are concerns that there may be a small effect on health from woodsmoke. Since everyone would prefer cleaner air, we should take action to reduce the amount of woodsmoke we produce. It will save you money and improve the health of your family, friends, neighbours and the community.

Hot tips for running your woodheater correctly:

- Get a good fire going quickly - use plenty of paper and dry kindling
- When starting the fire, reloading or preparing the fire for overnight burning, run the heater on high burn rate (air controls fully open) for 15 to 20 minutes before reducing the air supply.
- When logs are added, place them so that there is at least 25mm (1") between them to allow for air movement.
- Don't overload the heater.
- If there is no grate, place the log ends so they face the door, which allows the air to get to the base of the fire.
- Ensure there are plenty of flames present until logs are well charred.
- Go outside and check the amount of smoke your fire is producing. If there is a plume of smoke, try adjusting the air setting and the logs to get less smoke.

It is very important to buy dry wood. Store your wood in a dry and well ventilated shelter. Wet wood produces more smoke, a cooler fire and greater creosote build up in your flue.

For a comprehensive pamphlet on woodsmoke and the correct operation of woodheaters, contact Jennie McDonnell at the University of Tasmania, ph 6220 7455.

ROADS NEWS

There is good news from the Mount Stuart Residents' Traffic Committee (on which the Progress Association has a strong representation). The Hobart City Council has allocated funds to Mount Stuart for works to start after Christmas.

Priority is being given to the safety of our Mount Stuart Primary School children, with traffic calming measures to be installed around the School.

Next in priority are the traffic calming measures along what has become known as the "Rat Race" : the route across Mount Stuart from Lenah Valley to West Hobart. Tales of minor accidents and near misses are legion along this route. It is a matter of wonder and sheer good luck that there have not been more serious accidents. The proposed designs should reduce traffic speed, although no doubt to the frustration and chagrin of some late-for-work drivers who regularly attempt the crossing of Mount Stuart as if they are practising for Targa.

The safety fence along the middle of the bottom section of Mount Stuart Road is to be replaced, and safety is to be improved at the two sets of steps.

UP THE CREEKS

We have two little creeks on Mount Stuart. One is in the Providence Gully, a pleasant little park with a footpath used by the children on their way to school. At the time of writing, the weeds could usefully be trimmed before they run to seed, and Council has promised to organise this. This creek is piped as it leaves the Providence Gully park, passing under the North Hobart shopping area and resurfacing for a short distance at the back of the car park adjacent to the new inner city housing in Lefroy Street.

The other creek starts at the top end of Elphinstone Road, runs from the Toorak Avenue corner to the cul de sac off Montagu Street, under the Park on the corner of Newlands Ave and basically follows Montagu St down to the Maypole where it joins up with Maypole Creek. Anyone know if this creek has a name? Is it Montagu Creek or Rivulet?

The Council is planning beautification works for the open section of the creek between Elphinstone Rd and the flats at No 3a Montagu St . There is concern for the safety of children during times of heavy rain, when local residents advise that the creek becomes a raging torrent. We have passed these comments to the Council, with the suggestion that the creek be piped although the cost of this alternative may be prohibitive.

Further down the creek is piped, surfacing from time to time as it flows down the east side of Montagu Street, passing under Augusta Road and under the new Purity supermarket.

The section of creek which Council plans to improve is along a disused road reserve (the end of Elphinstone Road). It is said that this disused piece of road, and Elphinstone Road itself, was once the main road to the North from Hobart Town, and was then called Eaglehawk Lane. Why should anybody attempt the steep climb up

Elphinstone Road instead of going straight along the main road to the Maypole? Perhaps this was in the days before the creeks at the Maypole and at Creek Road were bridged. Perhaps some local historians could enlighten us on this.

SHAGGY DOG STORY

There are still complaints regarding dog droppings in our suburb. One resident (a wag?) has asked our Secretary to move at the next meeting, that offending dog owners be handcuffed and chained, and transported to permanent exile in the back of the dog catchers van to the slums of Churchill Avenue or Taroona. But David is reluctant to do so for fear it be carried unanimously. (Perhaps there are other ways of moving motions?).

TAI CHI

Mark Paul, an experienced instructor with Adult Ed and the YMCA, is running a Tai Chi class at the Hall on Tuesdays, 7-15 to 8-45 pm. Mark tells me that Tai Chi is suitable for all ages, both male and female, and is not strenuous. Phone Paul at 62492064.

HALL FLOORS

We have recently had the floors of the Annexe and the Supper Room resealed at a cost of $1700 approx. The floor in the main hall has worn down and will need replacing soon. We have written to the Hobart City Council, who own the building, requesting them to consider options for renewing the floor.

MOUNT STUART SCOUT GROUP

The Mount Stuart Scout Group currently has Cubs and Scouts running. Cubs meet Wednesday nights from 7.00pm to 8.30pm. Scouts meet on Monday nights from 7.00pm to 9.00pm. Both sections enjoy a wide variety of activities based around scouting and cater for both girls and boys.

Recently the scouts attended the statewide Corroboree which was held at Four Springs near Hagley over November 1-2. The Corroboree was held in celebration of the 90 years since Lord Baden Powell held the first scout camp on Brownsea Island. Over the weekend the scouts participated in activities such as cricket, soccer, scout games, estimation, woggle making, scout relays and construction. Although the weather was a bit damp, the scouts thoroughly enjoyed the weekend as not only was it action packed but a great opportunity to meet scouts from around the state.

Four Mount Stuart Scouts, Eleanor Cave, Ashby Newman, Julie Payne and Mark Sykes will be attending 18th Australian Jamboree in Queensland in the New Year.

Cubs have also been very active recently. On the last weekend of the September school holidays some of the older cubs attended the annual Cuboree near Penguin. It was a good weekend that all who attended enjoyed, making new friends and learning a great deal.

Up and coming events include the Group's annual camp which is to be held at the Lea Scout camp December 12-14 and the Scout Ranger Regatta which is to be held at St. Helens over the March long weekend.

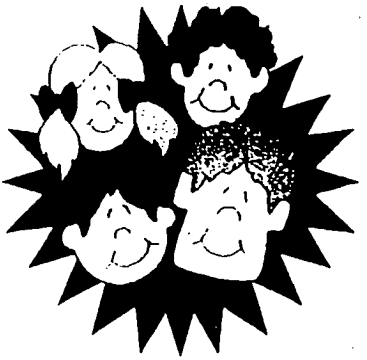
SHERRY LENDRUM DANCE STUDIO

- Ballroom and social dancing
- Group and private classes available
- Dances held regularly
- Classes held at the Hall
- Contact Sherry Lendrum Ph 6227 8423

HOBART CITY COUNCIL AFTER SCHOOL CARE

After school care is being offered at New Town Primary School for children aged 5 to 12 years. Fees per session are :

$7-00	First child
$6-00	Second Child
$5-00	any more



Childcare assistance is available for families receiving Additional Family Payment from the DSS.

For further information, contact Liz Horner, ph 014 481 639 or Hobart Family Day Care Ph 6223 3238.

ROLL ON 1998

This will be our last Mount Stuart News for this year so we take this opportunity to wish you a Merry Christmas and a Happy New Year.

NEW RESIDENTS

Welcome to all new residents - we hope you enjoy your new suburb. We think it is one of Hobart's top suburbs, but then we are unashamedly biased. No Tasmanian suburbs figured in Personal Investment's Top 200 Suburbs but perhaps we should keep it a secret.

STRATHERN LANE

We have been corresponding with the Council about the state of Strathern Lane for some time now, but without success. The surface is such a poor state that it is dangerous for pedestrians. There is no footpath.

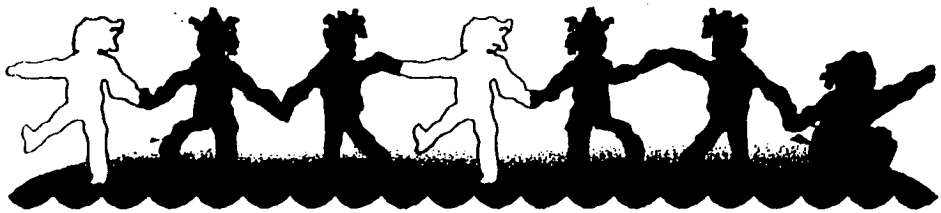
Strathern Lane is a "yellow road" which means that residents who have properties fronting onto are responsible for it. (Turnip Fields Road in South Hobart is another)

We have written to the Council pointing out the dangers of pedestrians using the Lane, but have had no response.

Strathern Lane residents may wish to keep it in its present state to discourage through traffic, but this could be resolved by installation of a barrier or lockable post at a convenient point.

MOUNT STUART BROWNIES

Brownies are held in the Supper Room of the Mount Stuart Hall



every Friday afternoon from 4.00pm to 6.00pm. Brownies will resume on 20th Feb 1998 and girls aged 7 and 8 are most welcome to attend. Contact Linley Grant on 6234 6672 or Margie McGarry on 6228 3132

Neighbourhood watch

INVERMAY EAST

JUNE NEWSLETTER

YOUR ZONE LEADER IS: Pat Castley

SOME INTERESTING POINTS FROM THE VIDEO AND TALK PRESENTED AT THE JUNE MEETING BY CONSTABLE TONY GRUNDGEIGER, NORTHERN DISTRICT CO ORDINATOR FOR COMMUNITY RELATIONS.

Most burglary of houses occurs during the day, most businesses at weekends.

The types of locks used are often a sign to burglars as to whether your house is a 'soft' or 'hard' target.

Test your house's security by seeing if you could break in.

Leaving radio and lights on can be a deterrent.

Dogs can be useful but less so if they are easily diverted by the offering of a biscuit,.

Sensor lights are not favoured by burglars.

You can help to keep your area safe by reporting faulty street lights.

If confronted by an intruder, scram.

Const. Grundgeiger also presented those present with a handout Home Secuity ~~Guide,~~ featuring details of points and methods of entry and listing a variety of ways to give your home the lived-in appearance which can deter intruders. Further copies of these are available from the Committee.

HOW IMPORTANT IS THE NEIGHBOURHOOD WATCH AND ITS NEWSLETTER TO YOU?

It is considered by the twenty Zone Leaders who deliver the 1100 Newsletters each month to be an essential part of the welfare of the Invermay East Community, but due to diminishing sponsorship from business and little financial support from residents, the future of the newsletter is at risk. Can you help by offering or suggesting some form of business sponsorship?

Can you donate even a small amount through your Zone Leader named at the top of the newsletter or one of the Committee listed below:

Co Ordinator: Pat Castley, 16 Albion Street Phone 63 312537

Ass.Co Ordinator: Bill Clayton,14 Little Green St. Phone 63 317441

Secretary: Graeme Warren 35 Bryan St. Phone 63 341046

Treasurer: Brian Habner, 1 Crawford St. Phone 63 263879

SMOKE ALARMS

Most people killed by fire die in their sleep. Thick dark smoke from fire can fill a house in seconds with deadly toxic, odourless gases and carbon monoxide. This can lull occupants into a deep sleep. Even in house fires, room temperatures can rise to one thousand degrees centigrade, producing air hot enough to scorch your lungs,. But the good news is that serious house fires can be prevented.

INSTALL A SMOKE ALARM. The cost is a small price to pay for the saving of life.

IS YOUR WOODHEATER SENDING YOU A SMOKE SIGNAL?

As advised in last months's newsletter, Jennie McDonnell presented to the June Meeting an information kit she proposes to present to our next meeting in August. She gave us a run down of the steps which need to be taken in the Launceston Community if we are not to be affected by the significant wood-smoke problem caused by the use of woodheaters by approx 60% of households in Launceston.

The good news is that we can do something about the problem if we can learn to use heaters correctly. It's all about the correct use of air control. Burning the heater for more than a few hours on minimal air supply is a major contributor.

Overleaf is an excerpt from the pamphlet prepared by Jennie as part of her study for a Master's degree in Environmental Health.

AT CASTREY
16. ALBION ST

Part 1 in a series of information about the issue of wood-smoke pollution from woodheaters and correct woodheater operation.

Why should we be concerned about wood-smoke?

There are concerns that wood-smoke in suburban areas is effecting the health of the general public, in particular children, the elderly and those with respiratory illness. Research suggests there might be a small effect on health from wood-smoke although even this is not proved. But since everyone would prefer cleaner air we should take action to reduce the amount of wood-smoke we produce.

The first thing you need to do if you own a woodheater ~~is walk outside~~, look up towards your flue and ask;

Is your woodheater sending you a smoke-signal?

If there is a plume of blue or grey smoke, you have a problem.

Wood-smoke is the result of incomplete combustion. Some of the pollutants contained in wood-smoke exacerbate respiratgory problems, like asthma, whilst others are known or suspected carcinogens. The important message is you can have warmth, comfort and a woodheater that minimises pollution if you know how to operate your woodheater correctly. If you run your woodheater incorrectly it will produce at least twice as much wood-smoke pollution.

CRIME REPORT FOR MONTH OF MAY

Thurs.1st Bryan St. Burglary of Shed. Cut padlock & bolt $20 damage Nil stolen.

Fri 2nd Burglary and Stealing Albion St. from vehicle 4 man Jackeroo tent, fishing rod and cassettes taken from car in garage $400.

Thurs.1st Little Ray St.Burglary & Stealing Shed Cut padlock and latch $15 damage Stihl chainsaw $600.

Btw Thurs.24/4 & Mon 5/5 Henty St. House. Cash and Medication. $80

Sat 3rd.Invermay Rd. Stealing Business Cash taken from tin near register

Btw. Tues.29/4 % Thur 1/5 Invermay Rd. Stealing Business Keno takings stolen from safe

Btw Sun 11 and Mon 12th Ray Street Trespass and Stealing Yard. Quantity of adult and childrens clothing and linen $800.

Sat 12/4 Invermay Rd. Business manipulate lock. Oxyacetalyne equipment $1039.

Offence date Sat 12/4.18 year old Invermay youth 14 year old Invermay youth and 16 year old Mayfield youth interviewed by detectives, admitted offence and were charged.

Mon 14/4 Invermay Rd. Burglary. Business. Same three youths as above charged.

Btw 29/4 & 16/5 Crawford St. Burglary & Stealing Vehicle Key Sports bag containing camera and sunglasses. Vacuum Cleaner $1070

Fri 16th Invermay Rd. Attempted Burglary Business. Phone line cut, globe removed and roller door forced.

Thur.15th Forster St. Burglary & Stealing Garage. 2 Beach rods, reel and line $300

25/5 Invermay Rd. Burglary Business

A 23 year old Launceston man was interviewed and charged.

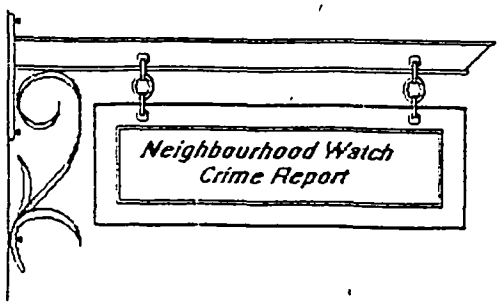
Btw Tues 27th and Wed.28/5 Herbert St.Destroy Property Business.Front window smashed $250

Btw Tues 27th Wed.28th Forster St. Burglary & Stealing Business Smash window $1000 damage. 3 Sunshine Threesom heater/light units and 1 Sunshine "Ensuite" bathroom heater/light unit.$460.

Neighbourhood watch

INVERMAY EAST JULY 1997

Your Zone Leader is:



FOR MONTH OF JUNE

Fri 30/5/97 Btw 7am & 3pm Trespass & Stealing Albion St. Yard. Quantity of clothing taken from clothes line Value $711

Sun 1/6/97 Btw 3am & 3.20am Destroy Property Invermay Rd. Business Entry not gained. Brick thrown through window $1000 damage.

Mon 9/6/Tues 10/6 Btw 9pm $ 7.15am Burglary & Stealing Oswald St. Unlocked Vehicle. Brown leather wallet containing cash, cards and personal papers, 2 woollen seat covers $250

Wed 11/6 Btw Destroy Property Invermay Rd. Vehicle Rear window smashed $300

Sat 21/6 Btw 9.30pm and 12mn Burglary & Stealing Albion St. House. Smash glass to access window latch, then slide open $100 damage. NEC Sports mobile phone $100

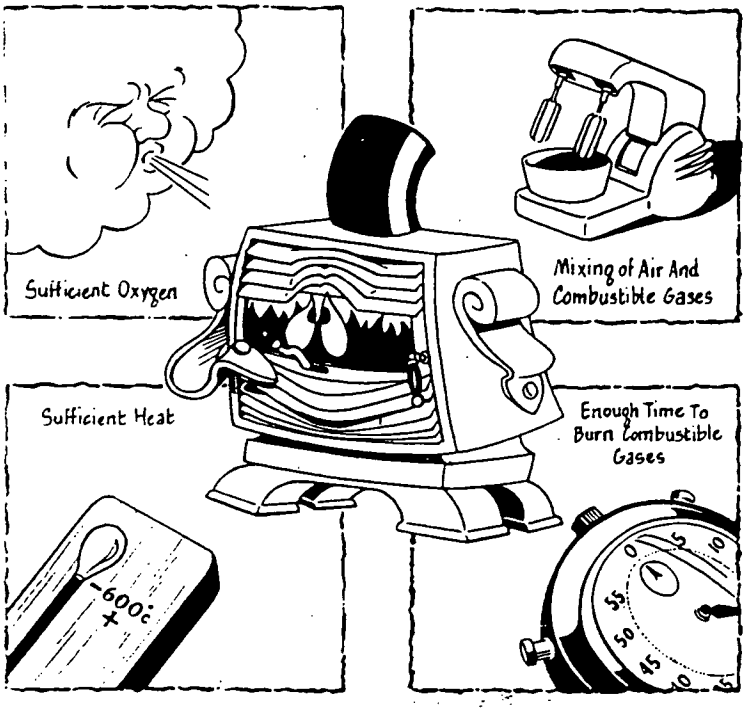
Sat 21/6 Btw 1.15pm & 6.15pm Burglary & Stealing Lamont St. House. Remove flywire and climb through window Money box stolen $30 damage,.

Sat 21/6 Btw 8am & 3.45pm Destroy Property Herbert St. House Entry not gained. Rock thrown through window, also damaging blind and fibro panel. Damage $500

Monday 23/6 Burglary & Stealing Bryan St. House. Unlocked door as occupant home. Brown suede Oroton bag containing purse, keys, cash, cards etc. taken from kitchen table. $350

Fri. 27/6 2.35am. Burglary & Stealing Invermay Rd. Business. Hole punched through roller door to manipulate lock causing $100 damage. Quantity of restricted drugs $150

THE ANNUAL MEETING OF THE INVERMAY EAST NEIGHBOURHOOD WATCH WILL BE HELD AT THE BRYAN ST. UNITING CHURCH AT 7.30 ON WEDNESDAY 6TH AUGUST. COME & SUPPORT THE ELECTION OF OFFICE BEARERS TO THE COMMITTEE.



Part 2 in a series of information about the issue of Wood-Smoke Pollution and correct Woodheater Operation.

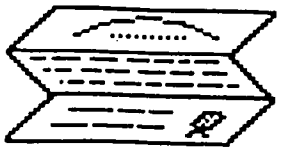
When wood is heated it releases highly combustible gases, tars and oils which when burnt create the flames and heat of the fire. Wood-smoke is the result of incomplete combustion of the wood. It consists of tiny particles of these unburnt gases, oils and tars which have not been combusted properly in the heater.. Wood-smoke is in fact wasted fuel. The amount of smoke produced and fuel wasted can be greatly reduced by correct operation.

TIPS FOR RUNNING YOUR WOODHEATER CORRECTLY

- Get a good fire going quickly. Use plenty of paper and dry kindling.
- Whenever starting a fire, reloading or preparing the fire for overnight burning, run the heater with air controls fully open for 15-20 minutes before reducing air supply.
- When adding logs, place them so that there is about 2-3cm between them to allow for air movement. Ensure there are plenty of flames present until the logs are well charred.
- It is important to buy dry wood. Wet wood produces more smoke, a cooler fire and greater creosote build up in your flue.
- Store your wood in a dry, well sheltered area. If you don't have a shed, cover with iron roofing to keep the rain off.

There are lots of other tips that can't be fitted into this article. If you would like to hear more on the issue of wood smoke pollution please join us at the August Meeting. Let's all work together to improve the quality of the air we breathe and the health of our families, friends and community.

CERTIFICATES OF APPRECIATION

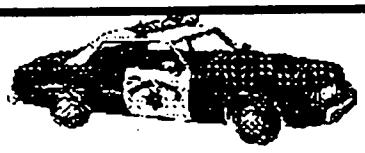


Certificates of Appreciation for service to the Community through the East Invermay Neighbourhood Watch since its inception five years ago will be presented at the August Meeting.

WHAT'S ON IN OUR COMMUNITY

AT BRYAN ST. UNITING CHURCH

iINDOOR BOWLS EACH FRIDAY EVENING AT 7. 30.
ALL WELCOME
SQUARE DANCING MONDAY & WEDNESDAY EVENINGS AT 7.30
CUBS 6PM TUESDAYS
SCOUTS 7.30PM TUESDAYS



Have you explained the fundamentals of Neighbourhood Watch to your Children ? Why not make a start now.

It's their future.....

Is your woodheater sending you a smoke signal?

If there is a plume of grey smoke rising from the flue, you have a problem.

Wood-smoke is, in fact, wasted fuel. By correctly operating your woodheater you can at least halve the amount of smoke produced.

There are concerns that there may be a small effect on health from wood-smoke. Since everyone would prefer cleaner air we should take action to reduce the amount of wood-smoke we produce.

It will save you money and may improve the health of your friends, family and community.

Tips for running your woodheater correctly.

- Get a good fire going quickly. Use plenty of paper and dry kindling.
- Whenever starting a fire, reloading, or preparing the fire for overnight burning, run the heater on high burn rate (air controls fully open) for 15 to 20 minutes before you reduce the air supply.
- When logs are added, place them so there is at least 2-3cm between them to allow for air movement. Ensure there are plenty of flames present until the logs are well charred.
- Go outside and check the amount of smoke your fire is producing. If there is a plume of smoke try adjusting the air setting and the logs to get less smoke.
- It is very important to buy dry wood. Store your wood in a dry and well ventilated shelter. Wet wood produces more smoke, a cooler fire and greater creosote build-up in your flue.

A comprehensive pamphlet and a guide to woodheater operation is available from the Council offices.

You can either collect one from the Reception desk or have one mailed to you by phoning Christine Hughes on 6245 8698.

Building service popular

Clarence Council's 24-hour turn-around period for some building applications is proving popular with builders and home owners.

There has been about a 10 per cent increase in lodgements since the service was introduced in early July.

The service applies to class 10 applications for sheds, garages, patios and carports.

Until this service was introduced, the council processed class 10 building applications in seven to 10 days. The 24-hour turn around is available provided all appropriate forms and plans are left at the council's planning and development counter by 1.00 pm.

Class 10 building applications must include:

- a completed application form (available from the council's planning and development counter or by calling 6245 8608)
- a full copy of the property title
- two site plans
- two copies of the building plans, which include drawings of the cross sections through the building, elevations, floor plans, foundation and flooring details and retaining wall details
- engineering certification (if applicable).

Calendar of events ...

September

4 Acquisitive Art Exhibition, Schoolhouse Gallery

28 Potters Society Exhibition, Schoolhouse Gallery

October

5 Arbor Day celebration
Neilson Park, Rokeby

9 Papermakers Guild
Exhibition, Schoolhouse Gallery

12 Richmond Village Fair

November

8 Lions 50th Anniversary Bonfire and Barbecue, Rosny Hill

16 Waverley in Full Colour — wildflower discovery walk

23 *Celebrate Tasmania*
Three Hills Race

27 Third Cricket Test, Bellerive Oval

30 Landcare/Coastcare Appreciation Day, Rosny Esplanade Park

December

5 Carols by Candlelight, Richmond

7 Ocean Care Day, Clifton Beach

11 One-day International Cricket, Bellerive Oval

12 Carols in Beltana Pk, Lindisfarne

14 Carols by Candlelight
Charles Hand Park

New parking signs that are clearer, easier to read

In line with their introduction throughout Tasmania, new parking signs that are easier to read are being progressively introduced in Clarence.

The new signs use symbols instead of words so that they can be read quickly and easily from a moving vehicle.

As a part of the new markings, yellow lines at the edge of the gutter or pavement are to be used to define a "No Standing" zone. In places where a yellow line is painted adjacent to the road edge, you are not permitted to stop a vehicle unless traffic conditions require it as in a queue of traffic. The yellow lines have the same requirements as a "no standing" sign or black and white markings.

The new signs and yellow edge lines are to be phased in over the next few years as new signs are installed or old ones replaced.

A brochure detailing the new signs is available at the Council Offices or by phoning 6245 8632.

Orana Camp expanded

The Orana Guide Camp at Roches Beach will display new conference facilities at an open day on Friday, 12 September.

The extensions to the camp were opened recently by the Mayor of Clarence, Alderman Cathy Edwards.

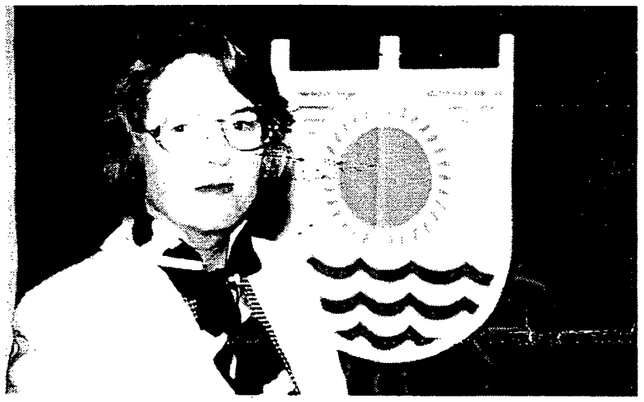
We got it wrong!!!

Two telephone listings in this year's Council Infobook are wrong.

The correct telephone number for the Lauderdale Tip is 6248 1343 and to enquire about or obtain trees under Council's revegetation programme the number is 6245 8632.

SPECIAL EDITION
Merger NEWS
Clarence City Council
A newsletter to keep you informed and show you how to have your say on proposed Council mergers affecting your community.
No 3
September 1997

Now's your chance to come and support Clarence



"Clarence will be putting its case to the Local Government Board at 1.30 pm on Tuesday, 16 September.

"This is your chance to show that you don't want Clarence to be torn apart or made part of a greater Hobart Council.

"I am inviting all Clarence residents to come and join me and show your support for our city on this important day"

— Mayor Cathy Edwards

Date — Tuesday, 16 September

Time — 1.30 pm - 4.00 pm

Where — Local Government Board Hearings,
Rydges Hotel, Argyle Street, North Hobart
— next to North Hobart Oval.

Tell us if you can come — even if you can only come for an hour your support would be welcome. If you can come, please ring Alex Van Der Hek on 6245 8635 and let us know.

... for details of Council's submission, see overleaf

Reasons why Clarence backs South East Council

Clarence City Council, in its submission to the Local Government Board, has proposed that if amalgamations are to occur, Clarence should become part of a new South East Council, which includes Sorell, Tasman and parts of Southern Midlands and Glamorgan/Spring Bay.

Releasing details of the submission, Clarence Mayor Cathy Edwards said 70 per cent of the Clarence community did not want the city to be amalgamated and 77 per cent did not want to see the city split.

However, if there are to be amalgamations, 82 per cent want all of Clarence included in a new Council area east of the Derwent. Only 15 per cent want Clarence included in a greater Hobart Council.

Alderman Edwards said that the review would certainly bring change and Clarence's option would create the best possible outcome for the community involved.

"If Clarence's option is adopted, the number of Councils in southern Tasmania would be substantially reduced", Alderman Edwards said.

Democracy maintained

She said it also provided a sound framework for resource management and improved relations between local and state government.

In addition:

It will provide a Council which can retain Local Government democracy and communities of interest.

It provides better opportunities for genuine economies of scale and other means of improving efficiency.

It provides a financially viable and sustainable Local Government unit.

It provides for a Council which can deal with all natural catchments in an efficient, effective and sustainable manner.

It will reduce the impact of job losses.

It provides a model which has overwhelming community support.

Alderman Edwards said that, using key performance indicators, Clarence Council is one of the most efficient Councils in Tasmania.

"Clarence residents have shown they have a high degree of satisfaction with the Council's performance and level of service across the whole range of Council activities.

"Clarence is recognised as a leader in Local Government in many areas, including financial management, waste management, natural areas management and delivery of a wide range of community services.

Benefits to community

"What has been achieved should not be lost but strengthened and built upon, thus bringing the benefits of efficient Local Government to the community east of the Derwent.

"The most efficient economic model involving the amalgamation of Clarence is the creation of a single Council east of the River Derwent.

"Economic research shows, that in the case of urban centres, the potential for economies of scale is exhausted at a population of about 50,000.

"There is strong evidence that a greater Hobart Council would not achieve efficiencies beyond those already obtained by Clarence, Hobart and Glenorchy.

"A South East Council would deliver demonstrable improvements in economic efficiencies.

"Any new model for Local Government in Tasmania must provide that municipal areas should become financially self sufficient and move away from grant dependence.

"A model which creates a municipal area reliant on grants is fundamentally flawed as the State government has no control over the allocation of grants.

"Grant dependence is not a long term sustainable option given the likely changes in State-Commonwealth financial relations.

South east region

"The South East Council model best meets the Board's Terms of Reference in respect to social and environmental criteria. The area has a unique assemblage of environmental and resource elements.

"State and Commonwealth Governments, major retailers, community service providers and resource users recognise South East Tasmania as a distinct region.

"Resource management and sustainable management of inland rivers, coastal and estuarine areas are best served by a South East Council.

"The Derwent estuary forms a clear boundary between identified biogeographic areas.

"A South East Council as part of a sector model for Southern Tasmania will provide the best means to achieve sustainable environmental outcomes, including management of the Derwent estuary.

"NO" to greater Hobart

"The Clarence community's view is absolutely clear. It is strongly against a greater Hobart Council and if there are to be mergers, there is overwhelming support for a South East Council including all of Clarence.

"There is a vast amount of evidence that urban and rural Councils can be successfully merged. For example, Richmond/Clarence and Lilydale/Launceston.

"The creation of a greater Hobart Council would have a significant detrimental effect on participation and representation in Local government and therefore is not in the community's best interests.

"Access to elected members and an environment which encourages and provides participation in Local Government would be better achieved by a South East Council than a greater Hobart Council.

"Clarence Council warns that direct comparison with Victoria should be treated with extreme caution. Evidence clearly shows that the outcomes in Victoria have not been as favourable as initially thought.

"Evidence from other States shows that rather than creating large capital city Councils, there is a clear trend to do the opposite.

"Clarence Council's submission is that in any transition arrangements, elected members must be responsible for the process."

Clarence City Council NEWS

SEPTEMBER 1997

Clarence Council cuts through business red tape

A service which gives business people fast, easy access to all the licence information they need to start a business is now available at Clarence Council.

Developed by a Hobart-based company for national use, the Business Licence Information Service (BLIS) is a one-stop-shop with information covering all aspects of business licence requirements.

"BLIS is designed to overcome the need for prospective business operators to get details about hundreds of different licences and permits from scores of government agencies," Clarence's Mayor, Cathy Edwards said.

"By dropping into Clarence Council's offices during business hours, prospective business owners can obtain a complete report of relevant licence requirements in around 10 minutes by answering a list of simple questions.

"A person from either the Planning and Development Counter, or the Council's Economic Development Unit, will help clients answer the questions, input the data on the computer, print out a report and in most cases, provide the relevant forms. Council can also take applications and fees for the permits it is responsible for.

"In fact, the service is so simple, quick and helpful for prospective business operators, that we were delighted to add this service to our list!"

Business owner Lesley Riewoldt uses the BLIS system with the Council's David Guinane and Mayor Cathy Edwards.

Sewerage for Tranmere

Over the next four months new reticulation pipework will be installed to 72 properties south of Arlunya Street and trunk mains will be constructed to link Tranmere to the Rokeby Wastewater Treatment Plant in readiness for the treatment plant upgrade which will take place in 1998.

Clarence Council has awarded contracts to Andrew Walter Constructions and Groombirdge Excavations Pty Ltd for construction of the first stage of the Rokeby/Tranmere Sewerage Scheme.

The reticulation will be progressively extended northwards to other areas of Tranmere during the next 18 months.

To date a total of 8 individual contracts have been awarded to undertake this project. The total value of the tenders let is $2,476,110.

Seniors Week in Clarence

Activities in Clarence for Seniors Week which runs from 22 to 28 September will centre on the Bellerive Community Arts Centre and the Clarence Senior Citizens' Club in Bellerive.

The Senior Citizens' Club will open its doors to the public on Tuesday, 23 September for an Open Day at which it will demonstrate all the activities undertaken by the Club.

Voices of Experience is the Seniors Week project being undertaken at the Bellerive Community Arts Centre. In a programme from 10.00am to noon each day of the week there will be

- Bonsai with Herbert Harding
- "Embroidering my life" with Elizabeth Glover
- Silk and Quilt with Jill Cartwright and Marie Moss
- A Creative Retirement with Viv and Jim Adnum
- Watercolour Demonstration with Eve McArthur

Strategic Plan review

Council adopted its Strategic Plan for 1997-2002 late last year, however the Plan is to be reviewed each year in September. We would like to hear your views on what changes, if any, you would like to see to the Plan.

The Plan contains a statement of Council's social, environmental and economic objectives, policies and programmes. It also sets out the major strategies on how Council will achieve these.

Copies of the current Strategic Plan are available at the Council Offices. If you would like a copy sent to you, phone Christine Hughes on 6245 8698.

Written submissions should be addressed to the General Manager, Clarence City Council, PO Box 96, Rosny Park 7018. Submissions will close on 19 September 1997.

This newsletter is printed on recycled paper